FORM PTO-1390 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE (REV. 1094) TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		ATTORNEY'S DOCKET NUMBER H0535/7014 U S APPLICATION NO (If known, see 37 CFR 1 5) 10/031673
INTERNATIONAL APPLICATION NO. PCT/US00/20211	INTERNATIONAL FILING DATE 24 July 2000 (24.07.00)	PRIORITY DATE CLAIMED 22 July 1999 (22.07.99)
TITLE OF INVENTION LYSINE OXIDASE LINKAGE OF AGENTS TO TISSUE		
APPLICANT(S) FOR DO/EO/US GREEN, Howard; RANDO, Robert R.		

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national procedures (35 U.S.C. 371(f) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.

5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ has been transmitted by the International Bureau.
   c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).

6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).

7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.

8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).

9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371©(4)).

10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(C)(5)).

Items 11. To 16. Below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98 with references.

12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.

13. ☒ A FIRST preliminary amendment.

14. ☐ A SECOND or SUBSEQUENT preliminary amendment.

15. ☐ A substitute specification.

16. ☐ A change of power of attorney and/or address letter.

17. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C.1.821-1.825.

18. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).

19. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).

20. ☒ Other items or information:
   Copy of page 1 of PCT Published Application
   Copy of Amendment under PCT Art. 34(2)(b)
   Copy of International Preliminary Examination Report

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U.S. APPLICATION NO (If known, see 37 CFR 1.5) 10/031673	INTERNATIONAL APPLICATION NO PCT/US00/20211	ATTORNEY'S DOCKET NUMBER H0535/7014

21. ☒ The following fees are submitted:

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):		CALCULATIONS PTO USE ONLY
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	$1000.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	$860.00	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but but international search fee paid to USPTO (37 CFR 1.445(a)(2)).paid to USPTO	$710.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) But all claims did not satisfy provisions of PCT Article 33(1)-(4)	$690.00	
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)	$100.00	
ENTER APPROPRIATE BASIC FEE AMOUNT =		$ 100.00

Surcharge of $130.00 for furnishing the oath or declaration later than ☐ 20 X 30 Months from the earliest claimed priority date (37 CFR 1.492(e)).				$ 130.00	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total Claims	20- 20 =	0	X $18.00	$ 0.00	
Independent Claims	11- 3 =	8	X $80.00	$ 640.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+$270.00	$ 0.00	
TOTAL OF ABOVE CALCULATIONS			=	$ 870.00	
☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above Are reduced by ½.				$ 435.00	
SUBTOTAL			=	$ 435.00	
Processing fee of $130.00 for furnishing the English translation later than ☐ 20 ☐30 Months from the earliest claimed priority date (37 CFR 1.492(f)).				$	
TOTAL NATIONAL FEE			=	$ 435.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate coversheet (37 CFR 3.28, 3.31). $40.00 per property			+	$	
TOTAL FEES ENCLOSED			=	$ 435.00	
				Amount to be: refunded	$
				charged	$

a. ☒ A check in the amount of $ 435.00 to cover the above fees is enclosed.

b. ☐ Please charge by Deposit Account No. _____ In the amount of $_____ To cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23/2825. A duplicate of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO

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NAME

31,616
REGISTRATION NO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

International Application No.	:	PCT/US00/20211
International Filing Date	:	24 July 2000 (24.07.00)
Earliest Priority Date	:	22 July 1999 (22.07.99)
Applicant(s)	:	PERICOR SCIENCE, INC. ET AL.
Title	:	LYSINE OXIDASE LINKAGE OF AGENTS TO TISSUE

Commissioner for Patents
Washington, DC 20231

PRELIMINARY AMENDMENT

Sir:

In the Claims

As indicated in the Amendment filed during prosecution in the PCT stage, the last two claims (numbered 89-90) were mis-numbered as originally filed and re-numbered as follows:

Claim Number as Filed	Claim Number as Amended
89 (second occurrence)	93
90 (second occurrence)	94

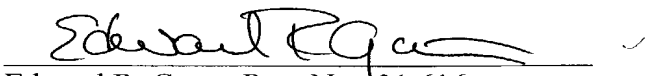
Accordingly, there are 94 claims pending in the above application, prior to this Preliminary Amendment.

In this Amendment, please cancel claims 11-23, 25-32, 34, 35, 37-39, 41-46, 49, 50, 52-63, 65-78, 80, 81 and 83-94, prior to calculating fees, and without prejudice to future prosecution.

Remarks

Claims 11-23, 25-32, 34, 35, 37-39, 41-46, 49, 50, 52-63, 65-78, 80, 81 and 83-94 are cancelled without prejudice to future prosecution. Claims 1-10, 24, 33, 36, 40, 47, 48, 51, 64, 79 and 82 are now pending.

Respectfully submitted,



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Attorney Docket No.: H0535/7011WO
Date: January 22, 2002
X01/22/02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
AS INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

International Application No.:	PCT/US00/20211
International Filing Date:	24 July 2000 (24.07.00)
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AMENDMENT UNDER PCT ARTICLE 34(2)(b)

Transmitted herewith is an amendment of the claims. The following documents are included: the Amendments Under Article 34(2)(b) (3 pages) and substitute pages 91, 94 (2 pages).

Respectfully submitted,

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DOCKET NO.: H0535/7011WO
DATE: 23 October 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
AS INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

International Application No.:	PCT/US00/20211
International Filing Date:	24 July 2000 (24.07.00)
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Applicant(s):	PERICOR SCIENCE, INC. ET AL.
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Commissioner for Patents
Box PCT
Washington, DC 20231

AMENDMENT UNDER PCT ARTICLE 34(2)(b)

Applicant respectfully requests that the International Preliminary Examining Authority make the amendments to the claims under PCT Article 34(2)(b), as described herein in connection with the above-identified application. Please substitute the enclosed sheets labeled as pages 91, 94 for original pages 91, 94.

Claims 1-92, 89, 90 are pending in the application. The final two claims in the application were incorrectly numbered 89 and 90, and thus these claim number were duplicated in the application. Applicants herewith renumber the final two claims as claims 93 and 94. Additionally, claim 66 is amended to recite dependency on claim 64. No new matter has been added.

Respectfully submitted,

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DATE: 23 October 2001

(d) at least five contiguous linked units having reactive groups,

(e) at least ten contiguous linked units having reactive groups,

(f) at least fifteen contiguous linked units having reactive groups, and

(g) at least twenty contiguous linked units having reactive groups,

wherein the reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines and lysines.

63. The method of claim 51, wherein the agent is selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

64. A kit comprising

a microparticle comprising surface available reactive groups in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase, and

lysine oxidase.

65. The kit of claim 64, further comprising instructions for topically administering the microparticle to a skin surface.

66. The kit of claim 64, further comprising a complementary linker.

67. The kit of claim 64, wherein the surface available reactive groups selected from the groups consisting of amines, aldehydes, aliphatic amines and lysines.

68. The kit of claim 64, wherein the microparticle further comprises an agent, an active agent, a non-nucleic acid active agent, or a non-protein active agent.

69. The kit of claim 68, wherein the active agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

86. The composition of claim 82, wherein the agent is not itself a substrate of lysine oxidase and is not able to react with lysine oxidase products.

87. The composition of claim 82, wherein the microparticle further comprises a synthetic polymer, preferably the synthetic polymer is latex or polystyrene.

88. The composition of claim 87, wherein the polymer rich in reactive groups is covalently linked to the synthetic polymer.

89. The composition of claim 82, wherein the microparticle is porous.

90. The composition of claim 82, wherein the microparticle has a size selected from the group consisting of greater than 5 μm, less than 5 μm, less than 1 μm, 100 nm to 500 nm, less than 100 nm, 20 nm to 90 nm, 20 nm to 35 nm, less than 20 nm, 1 nm to 10 nm, and 5 nm to 10 nm.

91. The composition of claim 82, wherein the lysine oxidase is exogenous lysine oxidase.

92. The composition of claim 82, wherein the reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of exogenous lysine oxidase.

93. The composition of claim 82, wherein the polymer rich in units having reactive groups is covalently attached to the microparticle.

94. The composition of claim 82, wherein the polymer rich in units having reactive groups comprises a polymer of amino acids and wherein at least 50% of the amino acids are lysine, or the polymer rich in reactive groups is reactive group rich at a surface available terminus, or

LYSINE OXIDASE LINKAGE OF AGENTS TO TISSUE

Field of The Invention

This invention relates to the linkage of agents to tissue by lysine oxidase and involves methods, products and kits relating thereto.

Background of The Invention

Transglutaminases are a family of calcium-dependent enzymes mediating covalent crosslinking reactions between specific peptide bound γ-glutamyl residues and various primary amino groups of peptide-bound lysines or polyamines, acting as amine donor substrates (Davies, et al., *Adv. Exp. Med. Biol.* 250, 391-401, 1988). These enzymes stabilize biological structures via the formation of isopeptide crosslinks. In mammals, at least five enzymatically active transglutaminases have been identified, cloned and sequenced. The number of proteins acting as glutaminyl substrates for transglutaminases is restricted, and no obvious consensus sequence around these substrates' glutamines has been found.

More recently, people in the art determined that as long as polypeptides including stretches of polyglutamine are rendered sufficiently soluble by the flanking residues, all were excellent substrates of transglutaminase. It also is described in U.S. Patent 5,525,336 (the disclosure of which is incorporated herein by reference in its entirety) that transglutaminases and corneocyte proteins, the natural substrates of transglutaminases, can be used together as cosmetic treatments to crosslink preparations of corneocyte proteins to the outer layer of skin, hair or nails to form a protective layer on the skin, hair or nails.

U.S. Patent 5,490,980 describes selecting agents having or modifying agents to have an aliphatic amine, and then attaching those agents to skin, hair or nails using transglutaminase. While the idea was sound in principle, in practice the '980 applicants achieved results that were barely above background. (See Example Section of '980 patent). An aliphatic amine was applied in the examples as a single linking molecule or prophetically in clusters (according to a formula in the '980 patent).

Lysine oxidase (EC 1.4.3.14) catalyzes the oxidative transformation of the ε-amino group of lysine to an aldehyde group. The resultant aldehyde group in turn undergoes an intermolecular Schiff base formation with amino groups of proteins or an aldol condensation with other aldehyde groups to forge cross links. Lysine oxidase (CAS # 70132-14-8;) is commercially available from Sigma Chemical Co., St. Louis, MO) (Cat. # L6150), and United States Biochemical Company (Cat. # 18612).

Summary of The Invention

It has been discovered that lysine oxidase (e.g., lysines) can be used to attach agents (including microparticles containing agents) to proteinaceous material such as body tissue. Lysine oxidase reacts with lysine amines to form aldehydes (i.e., lysyl aldehydes). As used herein, the lysyl aldehydes formed from lysyl amines by lysine oxidase are referred to as "lysine oxidase products" or "products of lysine oxidase." It also has been discovered that molecules, including native peptides and conjugates according to the invention, can be screened to determine those that can be substrates of lysine oxidases and those that can react with products of lysine oxidase, and then such molecules can be attached to a body tissue. Methods of attaching agents to body tissue and methods of screening molecules that are useful in such a process using lysine oxidase are provided. In addition, compositions of matter suitable as substrates for lysine oxidase, or which can react with lysine oxidase products such as aldehydes, and kits containing such molecules together with lysine oxidase are also provided.

According to one aspect of the invention, a method is provided for attaching an agent to a body tissue. An agent attached to a linker that is selected from the group consisting of compounds that are substrates of lysine oxidase (i.e., it possesses a lysine residue) and compounds that react with lysine oxidase products (i.e., it possesses an aldehyde or amine),k and the conjugate of the agent and linker is applied to the body tissue. In one embodiment, lysine oxidase also is applied to the body tissue, in an amount effective to permit crosslinking the agent which is attached to the linker to the body tissue. Thus attachment of the agent to the tissue occurs via the linker. Crosslinking then is allowed to occur. As used herein, an effective amount of lysine oxidase can be defined in terms of production of lysine oxidase products (e.g., aldehydes from lysine amines) or in terms of crosslinking of such products to their counterpart reactive molecules (e.g., amines and other aldehydes). In one embodiment, the lysine oxidase is applied to the body tissue first.

Thus, in some embodiments, the linker comprises a lysine oxidase substrate preferably in the form of a lysine residue. In these embodiments, the lysine oxidase acts on the linker and the linker can then react with an amine in the tissue. The lysine oxidase also could act on the body tissue and the linker to generate aldehydes on both. These aldehydes are then able to react spontaneously with each other.

In other embodiments, the linker comprises a reactive moiety that reacts with lysine oxidase products (i.e., it reacts with aldehydes). Such moieties are preferably amines or aldehydes. A lysyl aldehyde spontaneously reacts with an amine to form a Schiff base, or with an aldehyde to form an aldol (in an aldol condensation reaction).

Thus, the linker may comprise a molecule selected from the group consisting of at least one amine, aldehyde or lysine, at least two contiguous linked amines, aldehydes or lysines, at least three contiguous linked amines, aldehydes or lysines, at least four contiguous linked amines, aldehydes or lysines, or at least five contiguous linked amines, aldehydes or lysines. In preferred embodiments, the linker comprises 4 or more contiguous amines, aldehydes or lysines attached directly to one another by covalent bonds, such as peptide bonds.

In certain embodiments, the linker comprises a polymer. The polymer may be a polymer of amino acids. In some embodiments, at least 20%, at least 30%, or at least 40% or more of the amino acids are lysines.

In certain embodiments, the method further comprises first treating the body tissue to expose reactive molecules in the tissue (such as lysines).

In other embodiments, the method further comprises first attaching to the body tissue a complementary linker, and attaching the complementary linker and the agent to one another by crosslinking the linker (which is attached to the agent) and the complementary linker by the lysine oxidase. In some embodiments, the crosslinking occurs after exposure to lysine oxidase. In some embodiments, the complementary linker is attached to the body tissue by applying to the body tissue the complementary linker, applying to the body tissue an amount of lysine oxidase effective for crosslinking the complementary linker to the body tissue, and allowing said crosslinking to occur. In certain embodiments, the linker or complementary linker comprise a polymer rich in lysine. In preferred embodiments, the polymer rich in lysine has 4 or more contiguous lysines directly attached to one another by peptide bonds. The complementary linker may be crosslinked to the body tissue using transglutaminase, in some embodiments.

In any of the foregoing embodiments, the agent itself may, or may not, be a substrate of lysine oxidase. Alternatively, the agent may be, or may not be, capable of spontaneously reacting with a lysyl aldehyde. In another embodiment, the agent does not itself react with lysine oxidase substrates. In any of the foregoing embodiments, the body tissue may be

integument, skin, hair, nails, a wound bed, and/or internal body tissue. When in any of the foregoing embodiments, the body tissue is skin, hair, and/or nails, the agent may be a cosmetic, a bulking agent, a sunscreen agent, and/or a coloring agent. In some embodiments, the agent may be an enzyme. In certain embodiments, the enzyme includes a cholinesterase and/or a phosphodiesterase. In important embodiments, the agent is an anti-nerve agent. In related embodiments, the agent is an enzyme which degrades nerve agents and may be selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase. In any of the foregoing embodiments, the agent may be a pharmaceutical agent, a ligand of a ligand-receptor complex, and/or a receptor of a ligand-receptor complex. In certain embodiments, the bond between the agent and the linker is a hydrolyzable bond. In some embodiments, the agent may be a nonprotein. In some embodiments, the agent and/or linker are provided as a microparticle. In other embodiments, the agent and/or linker are not provided as part of a microparticle.

In one aspect, the invention provides a method for attaching an agent to a body tissue comprising first attaching to the body tissue a linker which is covalently bondable to the agent in the presence of lysine oxidase, then applying to the body tissue having the linker attached thereto an agent which is covalently bonded to the linker in the presence of lysine oxidase, applying to the body tissue lysine oxidase in an amount effective to crosslink that agent to the linker and allowing the crosslinking to occur. In one embodiment, the linker is a substrate of lysine oxidase and the linker is attached to the body tissue by applying to the body tissue the linker, applying to the body tissue the lysine oxidase in an amount effective to crosslink the linker to the body tissue and allowing the crosslinking to occur. In one embodiment, the a polymer rich in lysine is the linker. In another embodiment, the agent comprises a polymer rich in lysine. In one embodiment the agent does not comprise a microparticle, and in another the linker does not comprise a microparticle. The agent may be any of the agents described herein including an enzyme that degrades nerve agents such as OPPAA anhydrolase or squid type OPA anhydrase.

According to another aspect of the invention, a method is provided for attaching an agent to a body tissue. The method involves selecting an agent that is a substrate for lysine oxidase or an agent that can react (spontaneously) with a lysine oxidase product (i.e., a lysyl aldehyde). The agent, in an isolated form, then is applied to the body tissue in the presence of a sufficient amount of lysine oxidase to crosslink the isolated agent to the body tissue. As

mentioned earlier, this amount embraces the amount sufficient for converting lysyl amines (lysine oxidase substrates) to lysyl aldehydes (lysine oxidase products). Crosslinking then is allowed to occur. The crosslinking in all embodiments of the invention may occur in the absence or the presence of lysine oxidase, provided a sufficient number of lysine oxidase products have been produced prior to the crosslinking. In one embodiment, the agent can be attached to a linker, and the linker may not be native to the agent. It also is the case that the agent can be a native agent free of attachment with linkers (or molecules) not native to the agent. In some embodiments, the agent and/or linker are provided as a microparticle. In other embodiments, the agent and/or linker are not provided as part of a microparticle.

In any of the foregoing embodiments, the linker can be any number of a variety of linkers. In some embodiments, the linker is at least one amine or aldehyde. The linker, likewise, may comprise two or more contiguous linked amines or aldehydes. In a preferred embodiment, the linker is a polymer. The polymer may be rich units having amines or aldehydes. A polymer rich in amines or aldehydes is a polymer with at least 20% of units having amines or aldehydes or it is a polymer having at least three, preferably four and most preferably five contiguous, linked units comprising amines or aldehydes, preferably linked by peptide bonds. The polymer rich in units having amines or aldehydes can be a polymer that contains at least 30%, at least 40%, or even 50% or more of such units. In any of the foregoing embodiments (and other embodiments of the present invention), but particularly where the polymer is rich in both glutamines and lysines, a transglutaminase may also be used as well as the lysine oxidase according to the invention.

In certain aspects of the invention, lysine groups are first prepared for crosslinking through exposure to lysine oxidase which converts amines to aldehydes. In certain preferred embodiments, the methods described above involve first preparing the body tissue for the attachment of the agent to the body tissue. In one important embodiment, a complementary linker that is attachable to the linker by lysine oxidase or otherwise is first attached to the body tissue to provide multiple, accessible linking sites for the attachment of the linker to the body tissue. The complementary linker can be attached to the body tissue by any suitable means, but preferably is attached by applying the complementary linker to the body tissue, and applying lysine oxidase or transglutaminase to the body tissue in an amount effective for crosslinking the complementary linker to the body tissue. Crosslinking then is allowed to

occur. Preferably, the complementary linker is a polymer rich in lysine, or both glutamine and lysine.

As used herein, attachment or crosslinking by lysine oxidase embraces the reaction of lysines with lysine oxidase (to form aldehydes) followed by the spontaneous reaction of so generated aldehydes with other aldehydes (i.e., an aldol condensation reaction) or with amine groups such as those of lysine (i.e., a Schiff base formation) to form crosslinks.

Layers of such complementary linkers can be attached to body tissue. To exemplify, polylysine could first be attached to the surface of a body tissue using lysine oxidase. Subsequently polylysine could be attached to the polylysine by lysine oxidase, and so forth, to create layers of such molecules in the body tissues, for example, for bulking purposes or to provide an even, continuous bed of reactive groups for linking an active agent to the body tissue. Transglutaminase could be used for this purpose as well. As used herein a pair of molecules which are covalently joined are said to be "complementary" molecules.

As will be understood, multiple layers of polymers may be attached to the body surface for priming the body surface for attachment of an agent. For example, polymers comprising polylysine may first be attached to a body tissue. Then, agents attached to polylysine may be applied to the coated body surface and easily attached to the exposed lysines of the polylysines on the body surface. Similarly, agents attached to linkers containing aldehyde groups, or agents which themselves have aldehyde groups, may be applied to the coated body surface and easily attached to the exposed lysines of the polylysines on the body surface. Optionally, the exposed lysines may be treated with lysine oxidase before, during or after exposure to the agents. Preferably, the body surface or the linker is pretreated with lysine oxidase.

In some embodiments, the agent (or native agent) is not itself a substrate of lysine oxidase nor can it react with lysine oxidase products (i.e., it does not contain lysine or amines or aldehydes). Thus, it is required that the agent be attached to a compound that is a substrate of lysine oxidase or to a molecule that can spontaneously react with lysine oxidase products whereby the agent may be attached to the body tissue by such compounds which provide the linker. The compound may comprise aliphatic amines which can be oxidized by lysine oxidase and then coupled to amines or aldehydes, or alternatively, it may itself contain amines and aldehydes and thus can couple to aldehydes generated by the action of lysine oxidase. It

also is possible to modify peptide agents by adding a side group, whereby the agent which itself is not a substrate of lysine oxidase is converted to a substrate of lysine oxidase.

According to the foregoing methods, the agents, and agents attached to linkers, are attached to proteinaceous material. The preferred proteinaceous material is body tissue, including the integument, a wound bed, internal organs or internal tissue. Even more preferred in some embodiments are the skin, nails and hair.

According to the foregoing methods, the agent can be any variety of agents, including cosmetics such as bulking agents, coloring agents, sunscreen agents, hair conditioning agents, hair fixative agents, anti-foaming agents, moisturizing agents, including humectants, and depilatories (i.e., hair removal agents), vitamins, film forming agents such as those used in hair fixatives or wound healing, insect repellants including louse repellents, anti-nerve gas or anti-neurotoxin agents such as enzymes including cholinesterase and phosphodiesterase, pharmaceutical agents, ligands of ligand-receptor complexes, receptors of ligand-receptor complexes, and the like. In some embodiments, the agent is an enzyme that degrades nerve agents and may be selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase. In one embodiment, the agent is a member of a noncovalent coupling pair, such as biotin and avidin, to provide a universal linker as discussed in greater detail below. In certain embodiments, particularly those employing pharmaceutical agents, the bond between the agent and the linking molecule can be a bond which cleaves under normal physiological conditions or which can be caused to cleave specifically, for example, by exposure to light. In many instances where the agent is not itself a substrate of lysine oxidase, the agent is a non-protein.

According to another aspect of the invention, a method is provided for attaching an agent to a body tissue. A linker which is covalently bondable to the agent by any means including the use of lysine oxidase is attached to the body tissue. Then, an agent is applied to the body tissue. Lysine oxidase also is applied to the body tissue, in an amount effective to crosslink the agent to the linking molecule. Crosslinking then is allowed to occur. The linker can be attached to the body tissue by any suitable means, but in one embodiment the linker is a substrate of lysine oxidase or transglutaminase and preferably it is attached to the body tissue by applying the linker to the body tissue together with lysine oxidase or transglutaminase, the lysine oxidase or transglutaminase being present in an amount effective to crosslink the linker to the body tissue. Preferred linkers are lysine and polymers of

glutamine and/or lysine. Most preferred are polymers that are rich in lysine, or both glutamine and lysine.

In any embodiment, the agent can be any substance including those listed above but also including labels, extracellular matrix proteins and corneocyte proteins. Preferred body tissues are as described above. In some embodiments, the agent, linker or conjugate does not comprise a microparticle.

According to another aspect of the invention, a method is provided for attaching an agent to a body tissue. The method involves first attaching to the body tissue a linker which is covalently bondable to the agent in the presence of lysine oxidase. Then, the method involves applying to the body tissue having the linker attached thereto an agent that is covalently bonded to the linker, in the presence of the sufficient amount of lysine oxidase effective to crosslink the agent to the linker attached to the body tissue. Crosslinking then is allowed to occur. Preferred agents, linkers and body tissues are as described above.

According to another aspect of the invention, a method is provided for determining whether an agent is a substrate for lysine oxidase or whether it reacts with a lysine oxidase product. The method involves applying the agent in an isolated form to a proteinaceous material such as a body tissue, a body tissue isolate, a polymer rich in amine, such as preferably lysine and the like. Lysine oxidase then is applied to the proteinaceous material in an amount sufficient and under conditions appropriate to crosslink the agent to the proteinaceous material if the agent is a substrate of lysine oxidase or if it reacts with a lysine oxidase product. It then is determined whether the agent covalently binds to the proteinaceous material, covalent binding being indicative that the agent is a substrate of lysine oxidase or if it reacts with a lysine oxidase product. Preferably the agent is an active agent and, in other preferred embodiments, the active agent is a covalent conjugate of a native active agent and a linker not native to the active agent. In other embodiments, the active agent is a native active agent free of conjugation with groups not native to the active agent. Thus, in this aspect of the invention, methods are provided for creating conjugates of active agents and linkers (or linking molecules) and determining whether the conjugates are substrates for lysine oxidase or whether they react with a lysine oxidase product. In certain preferred embodiments active agents such as pharmaceutical agents, cosmetics, sunscreen agents and the like, which are peptides in their native form, are screened to determine whether

they are substrates of lysine oxidase or whether they react with a lysine oxidase product so that they may be attached to body tissue according to the invention.

Alternatively, the proteinaceous material (including lysines) is exposed to lysine oxidase, after which the agent (or linker) is applied to the material. It is then determined whether the agent (or linker) is covalently attached to the material. In yet another variation of this, the agent or linker may be applied to a solid support, lysine oxidase may be applied to the solid support coated with the agent or linker and a detectable label known to have amine, or more preferably, aldehyde groups, is applied to the support. If the detectable label remains attached to the support following washing, then this indicates a covalent bond and that the agent or linker was a substrate for lysine oxidase.

According to another aspect of the invention, a method for attaching an agent to a body tissue is provided. The method involves applying to the body tissue a conjugate of the agent and a linker which is an amine, an aliphatic amine or an aldehyde (preferably the linker being a polymer with at least 3 amines, aliphatic amines or aldehydes spaced along the polymer) applying to the body lysine oxidase in an amount effective for crosslinking the linker to the body tissue, and allowing crosslinking to occur. The amines and aliphatic amines can be the side chain of L or D lysines. D lysines have the advantage of being physiologically more stable than L lysines. Most preferably, the linker may include at least 3, at least 4 and at least 5 contiguous amines, aliphatic amines, lysines or aldehydes attached to one another directly by peptide bonds. The polymer also can be one rich in amines, aliphatic amines, or aldehydes. An example is a polymer rich in lysines, as described above. Preferred agents and body tissues are as described above.

According to another aspect of the invention, compositions of matter are provided. The compositions include conjugates of an agent and a linker, the linker in some embodiments being a substrate of lysine oxidase, in other embodiments being able to react spontaneously with a lysine oxidase product, and in still other embodiments, not being a substrate of transglutaminase. The agent includes a sunscreen agent, a bulking agent, a cosmetic, a hair conditioning agent including an anti-foaming agent or an anti-static agent, a hair fixative agent, a moisturizing agent, including a humectant, and a depilatory agent (i.e., a hair removal agent), a vitamin, a film forming agent such as those used in hair fixatives or wound healing, an enzyme, a coloring agent, a pharmaceutical agent, a member of a ligand/receptor pair, a component of a high-affinity non-covalent coupling pair, a tissue

sealant, an insecticide including louse repellents, an insect repellant, a bactericide, a fungicide, an anti-nerve gas or anti-neurotoxin agent and the like. In one embodiment, the linker is a substrate for lysine oxidase, is not a substrate of transglutaminase, and is not native to the agent. In other embodiments, the linker contains amines or aldehydes and thus can spontaneously react with lysine oxidase treated tissue. In certain embodiments, particularly those involving the pharmaceutical agents, the bond between the agent and the linker or molecule is a hydrolyzable bond. In certain important embodiments, the agent is a non-protein. In other important embodiments, the agent is an active agent. In other important embodiments, the agent, in its native form free of conjugation to the linker, is not itself a substrate of lysine oxidase.

According to other aspects of the invention, kits are provided. One such kit includes a package housing a first container containing an agent attachable to proteinaceous material in the presence of lysine oxidase and a second container containing lysine oxidase. The kit can further comprise a third container housed by the package, the third container containing a linker that is a substrate of lysine oxidase and that is covalently bondable to the agent contained in the first container in the presence of lysine oxidase. The various containers also can contain catalysts, vehicles, calcium, preservatives, buffers, and calcium chelators.

In another aspect, the invention provides a kit comprising a microparticle comprising surface available reactive groups in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase, and lysine oxidase. The kit further includes in one embodiment, instructions for topically administering the microparticles to a skin surface. In another embodiment, the kit include a complementary linker. The surface available groups may be selected from the group consisting of amines, aldehydes, aliphatic amines, lysine and, in general, substrates of lysine oxidase. Other embodiments that pertain to microparticle compositions as described herein are also embraced.

In yet another aspect, the invention provides a kit comprising a microparticle having surface available reactive groups in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase, and instructions for topically administering the microparticle to a skin surface, wherein the surface available reactive groups are selected from the groups consisting of aldehydes and amines. In one embodiment, the kit further comprising exogenous lysine oxidase. In one embodiment, the kit further comprises a cleanser. In yet another, it comprises a complementary linker. In yet another embodiment,

the microparticle is provided in a topically administered form selected from the group consisting of an ointment, an aerosol, a gel, and a lotion.

As mentioned above, the tissue can be pretreated to make it more receptive to the action of lysine oxidase. In one embodiment described above, this is accomplished by attaching polymers rich in lysine, or both glutamine and lysine to the body tissue. In other embodiments, the tissue is treated to expose reactive groups by washing, chemical treatment, etc. Detergents and lipases can be used to remove fatty acids and oils. Roughening agents such as pumice, silica and sandpaper can be employed to remove dead tissue and other obstructions, and chemical agents such as sodium hydroxide can be used to expose reactive groups. Combinations of the foregoing are contemplated. The tissue may also be pretreated by exposure to lysine oxidase.

The invention also involves the use of lysine oxidase to 'glue' two tissues together. Two tissues are held in contact with one another in the presence of an effective amount of lysine oxidase, whereby the lysine oxidase causes the crosslinking of the tissue to occur by, for example, converting lysines on both surfaces to reactive aldehydes which can crosslink with each other spontaneously to seal the tissue. The surfaces of the tissues to be glued to one another may be treated with a substrate of lysine oxidase such as polymers rich in lysine to create highly reactive surfaces in the presence of lysine oxidase. These highly reactive surfaces are bonded to one another. In another embodiment, the surfaces of the tissue are first treated with a primary linker to crosslink the primary linker to the surfaces, then a secondary linker complementary to the first is applied to crosslink the primary molecules to one another and glue the tissue. The lysine oxidase may be exogenously supplied. The tissue may be held together by any conventional means, such as sutures, tape, stapes and the like.

The agent also can be in a vehicle such as a microparticle (e.g. a microsphere, a microcapsule, or a nanosphere), the microsphere or microcapsule being rich in lysines, or glutamines and lysines, whereby the microparticle can be attached to a body tissue.

Thus in one aspect, a method is provided of treating a subject to attach microparticles to a body tissue of the subject comprising contacting the body tissue with lysine oxidase in an amount effective to permit crosslinking of the microparticles to the body tissue, contacting the body tissue with microparticles having surface available reactive groups in an amount sufficient to attach the microparticles to the body tissue in the presence of lysine oxidase, and allowing the microparticles to remain in contact with the body tissue for a time sufficient to

permit a layer of microparticles to covalently attach to the body tissue. In important embodiments, the body tissue is an external surface such as a skin surface, nails or hair. Some of the following embodiments recite skin surface as the body tissue, however, it is to be understood that any body tissue can be substituted in these embodiments. In one embodiment, the lysine oxidase is exogenous. In related embodiments, the reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of exogenous lysine oxidase.

In important embodiments, the surface available reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines or lysines. If the microparticles are to act as substrates of lysine oxidase, then the surface available reactive groups are preferably lysines. If the microparticles are to react with lysine oxidase products, then the surface available reactive groups are preferably amines or aldehydes.

In one embodiment, the layer of microparticles is non-planar. In another embodiment, the microparticles further comprise an agent. The agent may be an active agent, but it is not so limited. In one embodiment, the agent is a non-nucleic acid active agent, while in another embodiment, it is a non-protein active agent. In another embodiment, the agent is a protein agent. In certain embodiments, the active agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

In other embodiments, the active agent is not itself a substrate of lysine oxidase. In still other embodiments, the agent is not itself able to react with lysine oxidase products. An agent which is not able to react with lysine oxidase products is defined herein as an agent which lacks both amine and aldehyde groups. In one embodiment, the agent is an enzyme. The enzyme may be an enzyme that degrades nerve agent and may be selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

In one embodiment, the microparticles further comprise a synthetic polymer. The synthetic polymer may be latex or polystyrene, but is not so limited. In another embodiment, the microparticles are porous. In yet another, they are hollow. Depending upon the embodiment, the microparticles have a size selected from the group consisting of greater than 5 μm, less than 5 μm, less than 1 μm, 100 nm to 500 nm, less than 100 nm, 20 nm to 90 nm,

20 nm to 35 nm, less than 20 nm, 1 nm to 10 nm, and 5 nm to 10 nm. These sizes or ranges can be cut offs or can represent average size determinations. The microparticles may be non-biodegradable. In some preferred embodiments, they are water insoluble. In some even more preferred embodiments, they are detergent insoluble. In some embodiments, the microparticles enter the cornified layer of the skin but not the layer of living cells. However, in these latter embodiments, the agent contained within the microparticle may be able to enter the layer of living cells.

In some embodiments, the reactive groups are part of a polymer. The polymer may be covalently attached to the microparticle. In one embodiment, the polymer may be comprised of units at least 20%, at least 30%, at least 40%, or at least 50% of the units carrying reactive groups, wherein the reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines and lysines. In another embodiment, the polymer is rich in reactive groups at a surface available terminus, anywhere from 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15, or more units long, or at a surface available loop. In still other embodiments, the polymer comprises a polymer selected from the group consisting of at least two contiguous linked units each carrying reactive groups, at least three contiguous linked units each carrying reactive groups, at least four contiguous linked units each carrying reactive groups, at least five contiguous linked units each carrying reactive groups, at least ten contiguous linked units each carrying reactive groups, at least fifteen contiguous linked units each carrying reactive groups, and at least twenty contiguous linked units each carrying reactive groups. In some embodiments, the reactive groups in a polymer are the same (i.e., they are all lysines, all amines, all aliphatic amines, or all aldehydes).

The invention provides, in yet other aspects, compositions of microparticles and kits thereof. The foregoing embodiments relating to methods of use of microparticles are equally applicable to the following microparticle composition and kit aspects of the invention. Thus, in one aspect, the invention provides a composition having a microparticle comprising an agent and a polymer rich in amine or aldehyde reactive groups, wherein the amine or aldehyde reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase. In one embodiment, the lysine oxidase is exogenous, and in another it is endogenous.

In one embodiment, the reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of endogenous lysine oxidase. In another

embodiment, the reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of exogenous lysine oxidase.

In another aspect, the invention provides a composition comprising a microparticle having a non-nucleic acid active agent, and covalently attached surface available reactive groups, wherein the microparticle is 100 nm to 500 nm in size, or other sizes as described herein. In one embodiment, the surface available reactive groups are free pendant groups.

In any of the foregoing embodiments, agents may be derivatized to possess hydrazide reactive groups which react with aldehydes.

These and other aspects of the invention are described in further detail below.

Brief Description of The Drawing

Figure 1 depicts a kit according to the invention.

Detailed Description of the Invention

The invention involves in several aspects the linking of agents to a proteinaceous material. In general, the agents are chemical agents and include, but not are limited to, pharmaceutical agents, enzymes, cosmetics, sunscreen agents, ligands of ligand-receptor pairs, receptors of ligand-receptor pairs, components of high affinity noncovalent bonding pairs, insecticides and repellants, bactericides, fungicides, tissue sealants, labels, structural proteins, chelating agents and the like. In important embodiments, the agent is an anti-nerve gas agent. The agent may be an enzyme that degrades nerve agents and as such may be selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase. Examples of other agents useful in the invention are listed below.

By active agent it is meant that the agent, once coupled to a biological tissue *in vivo* or *in vitro*, has, maintains or can be released to have a desired activity such as a desired biological activity or therapeutic activity. Examples of active agents are pharmaceutical agents, sunscreen agents, insecticides, bactericides, fungicides, etc.

The agents are linked to proteinaceous material. When used *in vivo*, the agents are attached to a body tissue. Particularly important body tissues as sites of attachment are the integument (including specifically skin, nails, hair, mucous membranes and the surface of the eye), internal organs, internal tissue and wound beds. In *in vitro* applications, the tissue may be a body tissue, a tissue or cell isolate, isolated proteins, synthetic proteins, cell cultures and the like for use, for example, in assay systems according to the invention. In preferred embodiments, the body tissue is skin, nails, and hair.

In certain embodiments, conjugates of agents and linkers (as well as microparticles) are applied, for example, to body tissue and covalently linked to that tissue using lysine oxidase. As described earlier, crosslinking may occur in the presence of lysine oxidase but it need not. Lysine oxidase functions, in important embodiments, to prepare lysines for spontaneous bond formation in subsequent aldol condensation or Schiff base reactions. Thus, lysine oxidase, in some preferred embodiments, is applied to a lysine containing material (such as the body tissue, the linker, the agent or the microparticle (as described below)) and allowed to generate reactive aldehydes from the lysine amine groups. Once these reactive aldehydes are generated (or formed), they can spontaneously react with other substances that contain amines or aldehydes, to form covalent crosslinks.

As used herein, "linking" or "conjugate" means two entities stably bound to one another by any physiochemical means. It is important that the nature of the attachment be of such a nature that it does not impair substantially the effectiveness of the agent or the substrate binding ability of the linker. Keeping these parameters in mind, any linkage known to those of ordinary skill in the art may be employed, covalent or noncovalent. Covalent is preferred. Such means and methods of attachment are well known to those of ordinary skill in the art. An agent attached to a linker according to the invention is therefore a conjugate.

Typically the agents used according to the invention are not themselves, in their native form, substrates for lysine oxidase nor can they spontaneously react with lysine oxidase products. Such agents, however, can be modified according to the invention to render the agent so. This may be accomplished for example by adding an amine or an aldehyde side group(s) to an appropriate peptide moiety of the agent (i.e., a "modified" agent) or by covalently coupling an amine or aldehyde containing substance (such as lysine or polylysine) to the agent to form a conjugate that is useful. The most preferred method is to couple polylysine, to the agent to form an appropriate conjugate. Such a conjugate could function as a substrate for lysine oxidase and, as well, it could spontaneously react with a lysine oxidase product. In particular embodiments, the agent is preferably modified to contain aldehydes or it is conjugated to an aldehyde containing substance.

In some embodiments, the most preferred linkers (or linking molecules) are polymers rich in lysine. A polymer rich in lysine is a molecule wherein at least 20% of the units of the polymer are lysine, or wherein the molecule includes at least 3, preferably 4 and most preferably 5 contiguous, linked lysines. It should be understood, however, that as few as one

or two lysines can be attached to or tethered to an agent to render the agent a substrate of lysine oxidase. Similar definitions apply to substances, including polymers, that are rich in amines or aldehydes. Polymers rich in amines and aldehydes but not lysines are preferred in some embodiments. In other embodiments, polymers rich in both amines and aldehydes are useful. Depending upon the embodiment and use, these latter polymers may not, preferably, contain lysines.

As noted above, the invention in one aspect involves attaching active agents to proteinaceous materials using lysine oxidase, wherein the native agent itself is a substrate of lysine oxidase. Such agents typically will be polypeptides or proteins and most typically will contain reactive lysines. To determine whether an agent itself is a substrate of lysine oxidase (or a modified agent, or a covalent conjugate), a simple screening method is employed.

The screening method involves selecting an agent or an active agent, applying to or exposing the active agent to lysine oxidase and applying to the treated agent a detectable label known to spontaneously react with lysine oxidase products. Then it is determined whether the agent covalently binds to the detectable label. A similar assay for determining whether a linker is a substrate of lysine oxidase is also envisioned and embraced by the invention. In addition, substrates that react spontaneously with lysine oxidase products can be similarly identified with only routine experimentation. The amounts of materials and conditions employed for these assays are derivable from the examples below and, in general, can be derived by those of ordinary skill in the art without undue experimentation from, for example, the publication by Kahlem, et al., *Proc. Natl. Acad. Sci., USA*, Vol. 93, pp. 14580-14585, December, 1996.

In constructing conjugates, it may be desirable to vary not only the number of lysines or amines or aldehydes in the linker, but it also may be desirable to tether the linker to the active agent via a spacer. This can remove, for example, any problems that might arise from steric hindrance, wherein access by lysine oxidase to the reactive linker is hindered. These spacers can be any of a variety of molecules, preferably nonactive, such as straight or even branched carbon chains of C_1-C_{30}, saturated or unsaturated, phospholipids, amino acids, and in particular glycine, and the like, naturally occurring or synthetic. Additional spacers include alkyl and alkenyl carbonates, carbamates, and carbamides. These are all related and may add polar functionality to the spacers such as the C_1-C_{30} previously mentioned.

The conjugations or modifications described herein employ routine chemistry, which chemistry does not form a part of the invention and which chemistry is well known to those skilled in the art of chemistry. The use of protecting groups and known linkers such as mono and heterobifunctional linkers are well documented in the literature and will not be repeated here.

Attachment according to the invention thus need not be directed attachment. The components of the compositions of the invention may be provided with functionalized groups to facilitate their attachment and/or linker groups may be interposed between the components of these compositions to facilitate their attachment. In addition, the components of the compositions of the present invention may be synthesized in a single process, whereby the components could be regarded as one and the same entity. For example, a protein agent may be synthesized recombinantly to include a polylysine at one end for linking the polypeptide via lysine oxidase.

Specific examples of covalent bonds for attaching agents to linkers include those wherein bifunctional crosslinker molecules are used. The crosslinker molecules may be homobifunctional or heterobifunctional, depending upon the nature of the molecules to be conjugated. Homobifunctional crosslinkers have two identical reactive groups. Heterobifunctional crosslinkers are defined as having two different reactive groups that allow for sequential conjugation reaction. Various types of commercially available crosslinkers are reactive with one or more of the following groups: primary amines, secondary amines, sulphydryls, carboxyls, carbonyls and carbohydrates. Examples of amine-specific crosslinkers are bis(sulfosuccinimidyl) suberate, bis[2-(succinimidooxycarbonyloxy)ethyl] sulfone, disuccinimidyl suberate, disuccinimidyl tartarate, dimethyl adipimate·2 HCl, dimethyl pimelimidate·2 HCl, dimethyl suberimidate·2 HCl, and ethylene glycolbis-[succinimidyl-[succinate]]. Crosslinkers reactive with sulfhydryl groups include bismaleimidohexane, 1,4-di-[3'-(2'-pyridyldithio)-propionamido)]butane, 1-[p-azidosalicylamido]-4-[iodoacetamido] butane, and N-[4-(p-azidosalicylamido)butyl]-3'-[2'-pyridyldithio]propionamide. Crosslinkers preferentially reactive with carbohydrates include azidobenzoyl hydrazine. Crosslinkers preferentially reactive with carboxyl groups include 4-[p-azidosalicylamido] butylamine. Heterobifunctional crosslinkers that react with amines and sulfhydryls include N-succinimidyl-3-[2-pyridyldithio]propionate, succinimidyl[4-iodoacetyl]aminobenzoate, succinimidyl 4-[N-maleimidomethyl] cyclohexane-1-carboxylate,

m-maleimidobenzoyl-N-hydroxysuccinimide ester, sulfosuccinimidyl 6-[3-[2-pyridyldithio]propionamido]hexanoate, and sulfosuccinimidyl 4-[N-maleimidomethyl] cyclohexane-1-carboxylate. Heterobifunctional crosslinkers that react with carboxyl and amine groups include 1-ethyl-3-[[3-dimethylaminopropyl]-carbodiimide hydrochloride. Heterobifunctional crosslinkers that react with carbohydrates and sulfhydryls include 4-[N-maleimidomethyl]-cyclohexane-1-carboxylhydrazide·2 HCl, 4-(4-N-maleimidophenyl)-butyric acid hydrazide·2 HCl, and 3-[2-pyridyldithio]propionyl hydrazide. The crosslinkers are bis-[β-4-azidosalicylamido) ethyl]disulfide and glutaraldehyde. Amine or thiol groups may be added at any nucleotide of a synthetic nucleic acid so as to provide a point of attachment for a bifunctional crosslinker molecule. The nucleic acid may be synthesized incorporating conjugation-competent reagents such as Uni-Link AminoModifier, 3'-DMT-C6-Amine-ON CPG, AminoModifier II, N-TFA-C6-AminoModifier, C6-ThiolModifier, C6-Disulfide Phosphoramidite and C6-Disulfide CPG (Clontech, Palo Alto, CA).

In constructing conjugates, it also may be desirable to attach the agent to the linker by a bond that cleaves under normal physiological conditions or that can be caused to cleave specifically upon application of a stimulus such as light, whereby the agent can be released. In certain instances, the agent may be inactive in its conjugated form and activated only when released. In other instances, the agent would be released to exert an activity remote from its point of attachment to the body tissue. In still other instances, the agent would be released in a sustained fashion, to prolong the release of the agent versus an agent applied to tissue but not covalently coupled to the tissue. Readily cleavable bonds include readily hydrolyzable bonds, for example, ester bonds, amide bonds and Schiff's base-type bonds. Bonds which are cleavable by light also can be used.

Noncovalent methods of conjugation may also be used. Noncovalent conjugation includes hydrophobic interactions, ionic interactions, biotin-avidin and biotin-streptavidin complexation and other affinity interactions. In one embodiment, a molecule such as avidin is attached to a linker on a linking molecule such as polylysine. This conjugate, once attached to tissue according to the invention, then becomes a universal linking moiety for any agent attached to a biotin molecule.

As mentioned above, the linker or linking molecules may be part of a microparticle such as a microsphere or a microcapsule and the agent may be contained in the microparticle, either physically entrapped therein, covalently bonded thereto or otherwise physiochemically

attached to the microparticle. In preferred embodiments, the microspheres or microcapsules carry, at least on their surface, polymers rich in amines, aldehydes, or lysines depending upon whether they are to act as lysine oxidase substrates or are to react spontaneously with lysine oxidase products. The methods for manufacturing microparticles according to the prior art are well documented and do not form a basis for the present invention. Examples of microspheres and microcapsules and their method of manufacture may be found in U.S. Patent 5,075,019, PCT WO95/24929, PCT WO94/23738 and PCT/US96/11990, the disclosures of which are incorporated herein by reference.

The microparticles of the present invention differ from those of the prior art, in part, in having surface available reactive groups such as lysines, amines, or aldehydes in an amount sufficient to crosslink to a body tissue. These microparticles, their method of manufacture and their uses are described in more detail below.

Thus, as stated above, the invention relates, in part, to the discovery that microparticles with particular surface characteristics can be linked to a tissue and can thereby effect an extended period of agent delivery to the tissue.

The microparticles of the invention possess reactive groups on their surface (i.e., surface available reactive groups). Reactive groups include amine groups, such as those of lysine residues, aliphatic amine residues, such as those of lysine residues, lysines specifically, and aldehyde groups. The microparticles of the invention contain an active agent which when released from the microparticle provides prophylactic, therapeutic or cosmetic benefit to an external body surface with which it is in contact. In some embodiments, the microparticles of the invention are preferably intended for use on an external body surface such as skin, hair or nails. As a result, the microparticles which remain attached to the external surface and which do not degrade substantially throughout the course of treatment (e.g., days or weeks) are most useful in the invention. Any microparticle that contains an agent (as described herein) and that can hold (as a result of the covalent binding described herein) and release the agent onto an external surface (e.g., a skin surface) for a period of time sufficient for the agent to achieve its prophylactic, therapeutic or cosmetic purpose is useful in the invention.

Microparticles commonly effect delivery of agents by way of diffusion, or by degradation or erosion. Examples of diffusional systems in which the active agent permeates at a controlled rate from a polymer are described in U.S. Patents 3,854,480, 5,133,974 and 5,407,686. Examples of erosional systems in which the active agent is contained within a

matrix which in turn erodes with time are described in U.S. Patent 4,452,775, 4,675,189 and 5,736,152.

The invention provides microparticles which are either biodegradable or non-biodegradable. The term "biodegradable" as used herein refers to the ability of a substance (in this case, a microparticle) to degrade in vivo, (i.e., upon contact with external surfaces such as the skin). Commonly, biodegradable microparticles are made from polymers having bonds which are easily hydrolyzed once in contact with a physiological environment.

Preferably, the microparticle contains at least the agent, and even more preferably, it contains surface available reactive groups such as those described herein. Covalent linkage of the microparticle to the skin, hair or nails is desired. It is the covalent linkage which keeps the microparticles on the skin for the desired time, preferably in a layer, to achieve uniform and extended release of the active agent as desired. If the microparticles degrade too quickly, or degrade when contacted with a detergent such as soap, then the uniform distribution and extended release will be undermined. If degradation is slow or if degradation can occur independent of covalent attachment (such as degradation within a shell), then degradation can be acceptable. Thus, biodegradable microparticles are embraced by some aspects of the invention. Preferably, the biodegradable microparticles degrade substantially only after the period of time corresponding to the treatment (e.g., days or weeks) in order to ensure sufficient delivery of the active agent to the skin surface.

Microparticles that are differentially biodegradable are also useful in the invention. A "differentially biodegradable" microparticle is one which does not degrade uniformly throughout its volume. It may instead degrade initially in an internal or core region, as an example. Internally degradable microparticles may be formed by coating biodegradable cores with non-biodegradable porous films or shells. The microparticle may alternatively degrade from the outer surface, however, it would still be necessary that a sufficient amount of reactive groups remain covalently attached at the surface, and/or extending within the microparticle, even throughout the portion of the degradation process during which covalent attachment of the microparticle is desired. This can be achieved, for example, by a microparticle which is covalently crosslinked internally. In important embodiments, the microparticles are substantially non-biodegradable at their point of attachment to the skin surface over the period of time during which covalent attachment is desired.

Another type of microparticle which is useful to the invention is one which is non-biodegradable. A non-biodegradable microparticle is one which does not degrade upon exposure to a physiological environment or temperature. As mentioned above, such non-biodegradable particles release active agent by diffusion. It is preferred that a subset of microparticles having amine or aliphatic amine groups be non-biodegradable. In important embodiments, the microparticles are substantially non-biodegradable during the treatment period, which may last for several days to several weeks or completely non-biodegradable. In this instance, the microparticles will simply be sloughed off along with the dead skin cells to which they are attached. As is well known to those of ordinary skill in the art, the outermost portion of the skin (to which the microparticles will be attached in some instances) is not living and is sloughed off and replaced completely every 10 to 14 days.

The microparticles of the invention may be synthesized using naturally occurring or non-naturally occurring polymers. Non-naturally occurring polymers are referred to herein as synthetic polymers. Naturally occurring polymers include nucleic acids, peptides, polypeptides, carbohydrates, alginate, polysaccharides (e.g., dextran, cellulose and glycogen), lipopolysaccharides, chitosan, chitin, peptidoglycans, starch, glycosaminoglycans, collagen, rubber (cis-1,4-polyisoprene), guayule (Parthenium argentatum), collagen, chemical derivatives thereof (substitutions, additions of chemical groups, for example, alkyl, alkylene, hydroxylations, oxidations, and other modifications routinely made by those skilled in the art), albumin and other hydrophilic proteins, zein and other prolamines and hydrophobic proteins, copolymers and mixtures thereof.

The microparticles may further comprise one or more synthetic polymers or co-polymers. As used herein, the term "synthetic" refers to a substance which is not naturally occurring. Exemplary synthetic polymers include, but are not limited to, polyamides, polycarbonates, polyalkylenes, polysulfones, poly(2-sulfobutyl-vinyl alcohol)-graft-poly(D,L-lactic-co-glycolic acid), poly-hydroxyalkanoates, polyalkylene glycols, polyalkylene oxides, polyalkylene terepthalates, polydimethylsiloxane polyvinyl alcohols, polyvinyl ethers, polyvinyl esters, polyvinyl halides, silicones, polyglycolic acid (PGA), polylactic acid (PLA), copolymers of lactic and glycolic acids (PLGA), polyanhydrides, polyorthoesters, polyvinylpyrrolidone, polyglycolides, polysiloxanes, polyurethanes and co-polymers thereof, alkyl cellulose, hydroxyalkyl celluloses, cellulose ethers, cellulose esters, nitro celluloses, polymers of acrylic and methacrylic esters, methyl cellulose, ethyl cellulose, hydroxypropyl

cellulose, hydroxy-propyl methyl cellulose, hydroxybutyl methyl cellulose, cellulose acetate, cellulose propionate, cellulose acetate butyrate, cellulose acetate phthalate, carboxylethyl cellulose, cellulose triacetate, cellulose sulphate sodium salt, poly(methyl methacrylate), poly(ethyl methacrylate), poly(butylmethacrylate), poly(isobutyl methacrylate), poly(hexylmethacrylate), poly(isodecyl methacrylate), poly(lauryl methacrylate), poly(phenyl methacrylate), poly(methyl acrylate), poly(isopropyl acrylate), poly(isobutyl acrylate), poly(octadecyl acrylate), polyethylene, polypropylene, poly(ethylene glycol), poly(ethylene oxide), poly(ethylene terephthalate), poly(vinyl alcohols), polyvinyl acetate, poly vinyl chloride, polystyrene and polyvinylpyrrolidone.

Still other microparticles may be comprised of chimeric polymers of synthetic and naturally occurring residues. "Chimeric polymers" as used herein, refer to polymers of different residues or units. For example, a chimeric polymer may contain amino acid and non-amino acid residues, or it may contain natural and synthetic residues. As used herein, a residue in a polymer refers to (and may be used interchangeably with) a unit of a polymer. Examples of a polymer residue (i.e., a polymer unit) include an amino acid in a peptide and a nucleotide in a nucleic acid. Non-amino acid residues such as saccharides, fatty acids, sterols, isoprenoids, purines, pyrimidines, derivatives or structural analogs of the above, or combinations thereof and the like may be used. Non-naturally occurring non-amino acid substitutes include but are not limited to 2-azetidinecarboxylic acid, pipecolic acid, S-ethylisothiourea, 2-NH_2-thiazoline and 2-NH_2-thiazole.

The natural, synthetic and chimeric polymers may themselves be biodegradable or non-biodegradable, as intended herein. Examples of biodegradable polymers include synthetic polymers such as polymers of lactic acid and glycolic acid, polyanhydrides, poly(ortho)esters, polyurethanes, poly(butic acid), poly(valeric acid), and poly(lactide-cocaprolactone), and natural polymers such as those listed herein. In general, these materials degrade either by enzymatic hydrolysis or exposure to water *in vivo,* by surface or bulk erosion. The polymers may optionally be in the form of a hydrogel that can absorb up to about 90% of its weight in water and further, optionally may be crosslinked with multivalent ions or other polymers.

Examples of non-biodegradable synthetic polymers include latex, polystyrene, polystyrene derivatives, poly-N-ethyl-4-vinylpyridinium bromide, silicone, polypropylene, ethylene vinyl acetate, poly(meth)acrylic acid, polymethylacrylate, polyamides, copolymers

and mixtures thereof. U.S. Patent 5,861,149 discloses methods for making non-biodegradable microparticles which can be used in the present invention. Polystyrene particles useful in the invention are commercially available from a variety of manufacturers including Polysciences, Inc. (Warrington, PA), Seradyn (Indianapolis, IN) and Dynal.

The microparticles may also be formed from or may include non-polymer moieties such as lipids including sterols such as cholesterol, cholesterol esters and fatty acids or neutral fats such as mono- di- and tri-glycerides.

The microparticles may be made from organic and/or inorganic substances. The majority of polymers listed above are organic. Examples of inorganic substances include but are not limited to polyphosphate, zirconia-silica (ZS), $Si(OC_2H_5)_4$, $Al(NO_3)_3$ x $9H_2O$, $AgNO_3$, HNO_3, poly(phenylphosphinoborane) (an inorganic analogue of polystyrene) and PRIMM.

The polymer and non-polymers which make up the microparticles may be crosslinked, but need not be. Suitable crosslinking agents include those listed above. A wide variety of crosslinking agents suitable to the various chemistries of the microparticles described herein are commercially available from manufacturers such as Pierce Chemical Co. (Rockford, IL) and Sigma Aldrich (St. Louis).

In some embodiments, the microparticles may be predominantly composed of one or more polymers. A blend of natural and synthetic polymers may be used in microparticle synthesis. The microparticles may have an external coating composed of the same or a different polymer or non-polymer substance. As an example, the microparticle may be composed internally of polystyrene and an active agent and may have an exterior coating (preferably covalently attached) of a substance rich in reactive groups (as discussed below). In other related embodiments, more than one polymeric or non-polymeric substance, or a combination thereof, may be commingled prior to microparticle formation, resulting in their combined presence both internally and on the external surface of the microparticle.

As used herein, the term "microparticle" embraces particles, spheres and capsules of both nanometer and micrometer sizes (i.e., microparticles, microspheres, nanoparticles, nanospheres, microcapsules and nanocapsules). The microparticles may adopt a variety of shapes including regular shapes such as spheres and ellipses as well as non-regular shapes. Additionally, the surface may be, but need not be, smooth. The microparticles may be hollow with the agent stored in the core of the shell, in which case, they may be referred to as microcapsules or nanocapsules. Alternatively, they may be porous with the agent dispersed

throughout the solid polymeric or non-polymeric matrix, in which case they may be referred to as microspheres or nanospheres. A porous microparticle is one having internal, potentially interconnected channels (or pores) which are preferably open to the external surface of the particle. Methods for synthesizing hollow and porous microparticles are well known in the art. Porous microparticles are generally made by the inclusion of a porogen during microparticle synthesis followed by its removal (e.g., through dissolution in an appropriate solvent) and subsequent replacement with a solution containing the active agent. As provided herein, the porous microparticles may additionally have a coat comprising reactive groups (as described below), while being internally void of these groups.

In some embodiments, it is recommended, although not essential, that the microparticle be less than five microns in size (i.e., any single dimension of the microparticle is less than 5 microns). The microparticle should be small enough so as to feel smooth when applied to the external body surface. In some embodiments, it is preferred that the particles be large enough to preclude their penetration into the external surface. It has previously been reported that microparticles less than 100 microns are capable of penetrating the skin surface. In some embodiments, the microparticles or their surface available reactive groups are capable of penetrating the external surface, preferably up to, but not including, the layer of living cells. Thus, in some embodiments, the average size of the microparticle is less than 1 micron but greater than 100 nm, and in others, it is 100 nanometers to 500 nanometers. In still other embodiments, the average size of the microparticles is less than 100 nm in size, 20 nm to 90 nm in size, or 20 nm to 35 nm in size. These smaller particle sizes may be preferred when particle penetration of the skin is desired. In most instances, it may be undesirable for the microparticles to penetrate the living layer, and it is therefore intended that the microparticle remain in the cornified layer. It is believed that microparticles less than 1 nm, as well as others that are less than 5 nm could penetrate to the living layer, and thus should be avoided in most instances. However, it may be desirable for the particles to enter the cornified layer and thereby release their active agent which may diffuse into and thereby enter the living layer. Still, microparticles of an average size of 1 nm to 20 nm, I nm to 10 nm, and in particular 5 nm to 10 nm may be desirable in some aspects of the invention. It is well within the realm of the ordinary artisan to determine the size of particles which are best suited to the various embodiments recited herein.

It also should be noted that size may be uniform as in all the particles being of a certain size or range or size may be mixed. Where it is desired to prevent the microparticles from penetrating the outer most surface of the epidermis, then all the microparticles should be at least a certain size (e.g., at least 100 nm). If it is desired that all microparticles penetrate the outer most surface of the epidermis, then all should be no larger than a certain size (e.g., no larger than 100 nm). It also may be desired to have a variety of sizes whereby the microparticles will penetrate to different extents depending on size, thereby forming a three dimensional "layer". Size will depend upon factors such as the agent to be delivered, the condition being treated, the desired length of treatment, and other such factors well known to those of ordinary skill in the art. Appropriate size can be determined by no more than routine experimentation, trying different sizes to select the one or ones that are ideal for a particular purpose.

The microparticles are generally intended to be linked to proteinaceous material. When used *in vivo*, the microparticles are attached to a body tissue. Particularly important body tissues as sites of attachment are the integument (including specifically skin, nails, hair, mucous membranes and the surface of the eye), internal organs, internal tissue and wound beds. In *in vitro* applications, the tissue may be a body tissue, a tissue or cell isolate, isolated proteins, synthetic proteins, cell cultures and the like for use, for example, in assay systems according to the invention. In preferred embodiments, the body tissue is a skin, nail or hair surface.

Due to the use of these particles on skin, hair and nails, it is important that some of these particles be resistant to the action of detergents, such as those regularly used on these surfaces (e.g., hand, face and body soap, and shampoo). Thus, in some embodiments, the microparticles are water insoluble and, preferably, detergent insoluble (i.e., neither the microparticle nor the bond between the microparticle and the external surface are adversely affected by exposure to detergents, such as hand, body and hair soap). Many of the organic polymers listed herein are water insoluble. It is well within the realm of the ordinary artisan to determine which of these are preferred for making water insoluble particles. One way of making microparticles detergent insoluble is by crosslinking. If crosslinking is used, it is recommended that the reactive groups necessary to the invention (i.e., the amines, aldehydes, and lysines) are protected to prevent them from participating in the crosslinking, that a crosslinking agent be used which does not involve these reactive groups or that the reactive

groups be attached to the microparticle after such crosslinking. In another embodiment, the microparticles can be made more resilient to detergent treatment by the incorporation of fluorinated steroids as taught in U.S. Patent 4,927,687.

To be most useful, the microparticles must possess reactive groups. Reactive groups include aldehydes, amines, and aliphatic amine groups. The reactive groups may be provided by any moiety which contains them, including, but not limited to, peptides, polypeptides and proteins.

As suggested in the foregoing discussion, it is important that these reactive groups be accessible to the body tissue (e.g., the skin) to which the microparticles are to be bound. The reactive groups must be sufficiently exposed, and the "backbone" to which they are attached preferably sufficiently flexible, to react with and form a covalent bond with reactive groups on the contacted surface. Reactive groups which are present on the surface of the microparticles are likely to be accessible, and thus such "surface available" reactive groups are generally preferred.

Surface available reactive groups may be "free" or "fixed." Free surface available reactive groups include those which are present on a free, unconstrained end of a polymeric or non-polymeric substance, present at the surface of the microparticle. The free, unconstrained end of the polymeric or non-polymeric substance may be any length, provided the reactive groups contained therein are capable of reacting with the skin. Free reactive groups also embrace those which are non-complexed. A non-complexed reactive group is one which is not in physical association with another moiety to the extent that it is precluded from contacting and being covalently attached to a reactive group on, for example, the skin. Fixed reactive groups may also be useful in the invention, provided they are sufficiently flexible to bind to skin surface reactive groups. Thus, a reactive group may be present in a loop of a polymer the ends of which are both bound to the surface of the microparticle. As long as the loop is long enough and flexible enough to allow the reactive groups to contact and react with the skin surface, this type of "fixed reactive group" will be useful.

The surface available reactive groups must also be present in an amount sufficient to attach covalently the microparticles to the skin in the presence or absence (but at least pretreatment with) of lysine oxidase. Lysine oxidase may be supplied exogenously (i.e., exogenous lysine oxidase) or it may be endogenous to the tissue (i.e., endogenous lysine oxidase). The source of lysine oxidase plays an important role in the amount of surface

available reactive groups that are sufficient to link the microparticle to an external surface (and in the size of the microparticle, as discussed above). Exogenously supplied lysine oxidase may be supplied in quantities exceeding those which are available endogenously. As a result, in embodiments relying on the action of endogenous lysine oxidase for linking of microparticles to, for example, the skin, the amount of surface available groups sufficient for linking will generally be higher than that amount sufficient for linking using exogenous lysine oxidase.

Polymeric and non-polymeric substances from which the microparticles are synthesized may inherently possess the necessary reactive groups, or they may be derivatized either prior to or following microparticle formation to possess such groups. Alternatively, the microparticles may be formed of substances lacking reactive groups (e.g., polystyrene) and then coated with a substance which contains these groups. In a variation of this, the reactive groups may also be linked to the surface of the microparticle after microparticle formation. As an example, the surface may be prepared or treated to contain carboxamide residues, after which it is exposed to an excess of an aliphatic amine - containing polymer (e.g., present in a lysine-rich polymer) in the presence of limited quantities of transglutaminase. It is likely that even after binding of the carboxamide residues to the aliphatic amines in a 1:1 ratio, an excess of aliphatic amine reactive groups will still be present on and pendant from the surface of the microparticle. Polymers rich in the necessary reactive groups also can be covalently attached at a terminal end to the microparticle using homo and heterobifunctional crosslinkers. Useful crosslinkers are as described and listed herein. It further is envisioned that such polymers can be tethered to the surface of a microparticle by hydrophobic bonding tethers covalently attached to the polymer and hydrophobically attached to the microparticle. The manufacture of such microparticles is well within the realm of the ordinary artisan.

The methods for manufacturing a variety of microparticles according to the prior art are well documented. The present invention differs from those of the prior art, in part, in that the polymers or non-polymers of the microparticle themselves contain or are derivatized to contain amine aldehyde groups and/or lysines, especially at the surface, where they are available for covalent bonding to the skin.

Preferred polymers are polymers bearing multiple reactive groups that are substrates of lysine oxidase or that react with lysine oxidase products. Aliphatic amines that are

substrates of lysine oxidase also are well known and are included in albumin and polylysine, for example.

It has been discovered, surprisingly, that the spacing of the reactive groups can be important to achieving the results of the present invention. Thus, the present invention involves in one aspect using a plurality of, for example, aliphatic amines spaced apart at discrete intervals, preferably along the length of a branched or unbranched polymer. A further embodiment involves microparticles comprising polymers having multiple units, which each bear a reactive group in the form of an aliphatic amine or an amine or an aldehyde or a lysine. The polymer can be a homopolymer or a heteropolymer. Polymers include polymers which contain at least three reactive groups spaced apart from one another at discrete intervals along the backbone of the polymer, separated by one or more backbone atoms. This is most easily envisioned, for example, with polymers rich in lysine, whereby discrete units of the polymer carry the aliphatic amine, each being separately a substrate for lysine oxidase. The polymer may comprise or in some instances consist solely of contiguous lysines, preferably at least 3, at least 4 and at least 5 such contiguous lysines. Polymers of contiguous units, each carrying, for example, an aliphatic amine, are preferred. The same is the case for amines and aldehyde.

Another category of preferred polymer is those rich in amines, aldehydes, or aliphatic amines, such as lysine. A polymer rich in lysine is a molecule wherein at least 20% of the units of the polymer carry an aliphatic amine, or wherein the molecule includes at least 3, preferably 4 and most preferably 5 separate and discretely spaced by a regular distance aliphatic amines, such as occurs with contiguous, linked lysines. In other embodiments, the polymer includes at least 10, at least 15 or at least 20 separate and discretely spaced aliphatic amines. It should be understood, however, that a chain of as few as two lysines can be attached to or tethered to an microparticle to render the microparticle a "substrate" of lysine oxidase. The polymers may also contain at least 30%, at least 40%, at least 50% or more of lysine, depending upon the embodiment. Other preferred polymers containing amines (but not lysines or aliphatic amines) or aldehydes are similarly defined.

In constructing microparticles, it may be desirable to vary not only the number of surface available reactive groups, but it also may be desirable to tether the reactive groups to the microparticle via a spacer. As discussed earlier, this can remove, for example, any problems that might arise from steric hindrance, wherein access by, for example, lysine

oxidase, to the reactive group directly on the surface is hindered. Similarly, the tether can facilitate the reaction between reactive aldehydes on the surface and amines or aldehydes on another, regardless of which are present on the microparticle.

The polymers may also have termini (either amino or carboxy) that are predominantly rich in reactive groups. Preferably, the termini are located on the surface of the microparticle. The terminus may be 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15 or more units at a terminal end of a polymer. The reactive group rich stretch of the polymer may also be located on a "loop" of a polymer which is present at the surface of a microparticle.

As mentioned earlier, a number of different techniques exist for making microparticles including phase separation, solvent evaporation, emulsification and spray drying. The following examples are intended to provide guidance in the synthesis of some microparticles of the invention, but are not to be construed as limiting the invention in any way. These examples describe how to make microparticles that act as substrates of lysine oxidase. It is well within the realm of the ordinary artisan to apply such teachings to the manufacture of particles that, rather than being substrates of lysine oxidase, react with lysine oxidase products, without undue experimentation.

Encapsulated microspheres made from poly(lactide-co-glycolide) and poly(ε-CBZ-L-lysine) and subsequently treated so as to expose surface reactive amino groups have been reported previously. (Zheng and Hornsby, 1999, Biotechnol. Prog. 15:763-767) Once the microspheres are formed using double-emulsification/solvent evaporation (Alonso, et al., 1993, Pharmacol. Res. 10:945-953), the carbobenzoxy (i.e., CBZ) protective groups are removed using either acid hydrolysis or lithium/liquid ammonia reduction, thereby exposing reactive amine groups. Lithium/liquid ammonia reduction is recommended if microsphere are desired, given its less harsh effect of the external surface of the microparticle. In addition, the lithium treatment was reported to be more effective in producing surface reactive amino groups than was the acid hydrolysis procedure. If a solid surface particle (i.e., a microsphere) is desired, the lithium treatment may be preferred. In this latter method, the active agent may be added during the formation of the microparticles since the lithium treatment reportedly does not create pores in the surface of the particles and thus will not adversely affect the agent. If, on the other hand, a surface porous particle is desired, then the acid hydrolysis method may be preferred, provided the agent is either resistant to the acid treatment or is loaded into the particles following acid treatment.

A similar strategy may be used to produce non-biodegradable microparticles, by substituting poly(lactide-co-glycolide) with a non-biodegradable polymer such as those disclosed herein. In another variation of this method, a copolymer of lysine and a synthetic polymer such as, for example, poly(lactic acid-co-lysine) may be used alone to form the microparticles followed by mild acid hydrolysis or lithium treatment. Such lysine containing copolymers have been manufactured previously. (Barrera, et al., 1993, J. Am. Chem. Soc. 115:11010-11011) In yet a further variation, it may be possible to form particles from a biodegradable or a non-biodegradable polymer mixed with a CBZ-lysine rich polymer which is not poly-lysine or, alternatively, with short peptide or peptidomimetic backbone compounds which contain CBZ-protected aliphatic amines.

In another modification, microparticles may be made using the technique of Zheng and Hornsby but excluding poly-lysine. After being formed, the microparticles may be coated with a solution of poly(ε-CBZ-L-lysine). Commercially available microparticles such as those made from polyacrylamide, polyacrylate, polystyrene, or latex (Bio-Rad Laboratories (Richmond, CA), LKB Produkter (Stockholm, Sweden)) or those made from natural polymers such as agarose, crosslinked agarose, globulin, and liposomes (Bio-Rad Laboratories (Richmond, CA), Pharmacia (Piscataway, NJ), IBF (France)) can also be coated with CBZ-protected as well as non-protected lysine containing polymer solutions following agent loading. Microcapsule coating methods are known in the art.

Whether a microparticle so generated according to the teachings herein is a substrate of lysine oxidase or whether it is so able to react with a lysine oxidase product can be determined using the assays described herein for linkers and agents. Preferably, the microparticle is loaded with a detectable label such as a fluorescent dye or a fragrance. As applied to the screening assay, it is recommended that the labeling agent is covalently fixed to the microparticle such that no label escapes from the microparticle. This will ensure that any label detected on the external surface is indicative of a microparticle that is bound to the surface rather than a label which has exited a microparticle which itself was not capable of binding to the surface. In a further modification of this assay, once the microparticle is allowed to bind to the surface, the surface may be additionally washed with water and/or a detergent and then again tested for the presence of the microparticle. The amounts of materials and conditions employed for these assays are derivable from the examples below and, in general, can be derived by those of ordinary skill in the art without undue

experimentation from, for example, the publication by Kahlem, et al., *Proc. Natl. Acad. Sci., USA*, Vol. 93, pp. 14580-14585, December, 1996.

Prior to contact with the body tissue, the microparticle is loaded with an agent, either physically entrapped therein, covalently bonded thereto or otherwise physiochemically attached to the microparticle. The agent may be incorporated (i.e., "loaded") into the microparticle either at the time of, or after, microparticle formation, depending upon whether the microparticle formation process would be deleterious to the active agent. The agent may be an active agent. By active agent it is meant that the agent, once coupled to a biological tissue (such as skin) *in vivo* or *in vitro*, either directly or indirectly via a microparticle, has, maintains or can be released to have a desired activity such as a desired physiological, prophylactic, therapeutic or cosmetic activity. Examples of active agents are pharmaceutical agents, sunscreen agents, insecticides, bactericides, fungicides, etc. In certain embodiments, the active agent is not a labeling agent such as a diagnostic agent. In other embodiments, the agent is not a cosmetic agent.

In some embodiments where the microparticle comprises poly-lysine as the source of reactive groups, the active agent is a non-nucleic acid active agent. A non-nucleic acid active agent, as used herein, refers to an active agent which is not a nucleic acid. In other embodiments, the active agent is a non-protein active agent. A non-protein active agent is an active agent which is not a protein (i.e., it is not composed exclusively of peptide linkages of amino acid residues or units). In other embodiments, the agents can be selected from the lists provided herein.

In certain embodiments the agent is a noncorneocyte, nonlabeling active agent. Thus, specifically excluded in these particular embodiments are corneocyte proteins. In certain embodiments the agent also is a non-extracellular matrix protein agent. A non-extracellular matrix protein agent is one that is not an extracellular matrix protein. A nonlabeling active agent is one that is not simply a passive label with no function, when applied to a body tissue, other than being a label. Thus, specifically excluded in some embodiments are labeled corneocyte proteins, labeled fibronectin, labeled extracellular matrix proteins, putrescine, dansylcadaverine, 5-(biotinamido)-pentylamine, fluoresceincadaverine and the like.

The active agent may be linked to the natural, synthetic or chimeric polymer or non-polymer of the microparticle. Such linkage may be covalent in nature. Preferably, any linkage between the active agent and another component of the microparticle is characterized

by a bond that cleaves under normal physiological conditions or that can be caused to cleave specifically upon application of a stimulus such as light, whereby the agent can be released. These bonds are as described herein. In other instances, the agent would be released to exert an activity remote from the point of attachment of the microparticle to the body tissue.

In some embodiments, it is preferred that the active agent is free and not linked to another component of the microparticle. In these latter embodiments, the release of the active agent from the microparticle is dependent upon the flow of (physiological) fluids into the porous network of the microparticle, the dissolution of the active agent in such fluids and the exit of fluid and agent from the microparticle. Preferably, the agent would be released in a sustained fashion.

Active agents in an isolated form may also be used according to the invention. "Isolated" as used herein will depend upon the agent employed. In general, isolated means that the material is essentially free of other substances to an extent practical and appropriate for the intended use of the material. In the case of pharmaceuticals and cosmetics, the materials are likely to be substantially pure. In the case of proteins, the proteins are sufficiently pure and sufficiently free from other biological constituents of the host cells from which the proteins are derived so as to be useful in the methods according to the invention. Typically, such active agents will be at least 95% or more pure.

Agents are sometimes described as native agents herein. A native agent is one as it occurs in nature (isolated or synthesized to duplicate a naturally occurring molecule), without modification or conjugation as described herein.

As mentioned above, the body tissue, to which the microparticles are to be applied, may be, but need not be, pretreated to facilitate the reaction with transglutaminase. Such treatments include washings, abrasive treatments including physical agents such as pumice, silica and oatmeal, enzymes such as papain, bromelins and the like and chemical agents such as alpha hydroxy acids and glycolic acids. The main object is to treat the body tissue so as to expose or create reactive glutamines and/or lysines. Likewise, as mentioned above, the body tissue may be pretreated by putting down a layer of reactive groups, such as by applying to the body tissue polymers rich in lysine, glutamine or both lysine and glutamine. These materials may be attached to the body tissue by any conventional means, but, according to the invention, also may be attached using transglutaminase. The body tissue in many embodiments is pretreated with lysine oxidase as part of the invention.

It should be noted that polymers of lysine are described above. As used herein, such terms embrace nonpeptidic multimers of lysine whereby amino acid analogs are used to replace these amino acids in the or polylysine substrates. Some well known classes of peptide mimetics and pseudopeptides are: azabicycloalkane amino acids; thiazabicycloalkane amino acids; oxazabicycloalkane amino acids; diazabicycloalkane amino acids. D-amino acids are an important embodiment.

The invention thus may be used, *inter alia*, to localize drugs to a tissue such as a wound bed or for localized delivery to a tissue, to hold a drug, insect repellant, bactericide fungicide, growth factors, cytokine, and the like at a particular location to prevent the drug from being flushed away to other body sites where it is not needed, to apply bulking agents and other cosmetic agents to the integuments, such as the skin, hair and nails, to hold sunscreen agents at the surface of the skin for longer periods of time, to hold anti-nerve gas enzymes at the surface of the skin whereby nerve gas can be deactivated, to hold or link chemical agents to the skin which can in turn act as binding sites for other agent or alternatively, as reactive sites for catalytic buildup of multiple alternating layers, to link hydrophobic compounds to the skin, thereby making the skin hydrophobic, to link conditioners to the hair, thereby giving hair the appearance of greater bulk and to provide agents to organs or tissues which are to be transplanted.

In one embodiment lysine oxidase is used to glue two tissues to one another. This can be accomplished in a variety of ways. Lysine oxidase, a substrate of lysine oxidase, or both can be supplied to the surfaces of two tissues which then are held in contact with one another for a period of time sufficient to permit lysine oxidase to crosslink the tissues to one another. In one circumstance, exogenously supplied lysine oxidase is applied to the surfaces of the tissues to crosslink substrates of lysine oxidase to one another, which substrates are present and are endogenous on the surfaces of the tissue. In another circumstance, exogenously supplied substrates of lysine oxidase are applied to the surfaces of the tissues and are acted upon by endogenous lysine oxidase to crosslink the tissue surfaces to one another. In another circumstance both lysine oxidase and substrate of lysine oxidase are applied to the surfaces of the tissue to crosslink the surfaces to one another. In this situation, a single substrate such as polylysine could be applied, one end attaching to one surface and the other end attaching to the opposing surface of the tissues to be crosslinked to one another. Alternatively, a first substrate (a primary linking molecule) could be applied to create first reactive surfaces of a

primary linking molecule (e.g. polylysine) and a second substrate (a secondary linking molecule complementary to the primary linking molecule) could be applied to crosslink the primary linking molecules on opposing surfaces to one another.

The invention further provides methods of treating a subject to attach microparticles to a body tissue of the subject by contacting a tissue of the subject with lysine oxidase and with a microparticle having surface available reactive groups and allowing the lysine oxidase and the microparticles to remain in contact with the tissue for a time sufficient to permit a layer of microparticles to covalently attach to the tissue. The reactive groups are present on the surface of the microparticle in an amount sufficient to attach the microparticle to the skin surface in the presence of lysine oxidase or lysine oxidase products. The lysine oxidase may be endogenous (i.e., provided by the tissue to which the microparticle is applied) or exogenous. The quantity of surface available reactive groups which is a "sufficient amount" will vary depending upon whether the lysine oxidase is endogenous or exogenous, and, in some instance, on the number of lysine oxidase products on the tissue, as described above. A sufficient amount of surface available reactive groups can be achieved, for example, by increasing in the microparticles the number of residues which have the reactive groups, or by increasing in the microparticles (and particularly at the surface) the number of available reactive groups by preventing their chemical reaction with other reactive groups either intrinsic or extrinsic to the microparticle. Whether the particles have a "sufficient amount" of surface available reactive groups can be tested as described herein. Preferably, the body tissue is an external surface such as skin, nails or hair. In important embodiments, the tissue is a skin surface.

As used herein, a subject may be a human, non-human primate, cow, horse, pig, sheep, goat, dog, cat, rabbit or rodent. In all embodiments, human subjects are preferred.

The subject to be treated according to the methods of the invention is one who will benefit from the treatment with the microparticles. Such treatment can be prophylactic, such as when the microparticles contain a sunscreen agent or a UV filter, or it can be therapeutic, such as when the microparticles contain an anti-fungal agent. Additionally, the subject may be one in need of cosmetic benefit, in which case the microparticles may contain a cosmetic such as a moisturizer or a skin tanning agent.

The term "contacting" as used herein refers to a physical interaction between the skin surface and the microparticles, or between the agents and the skin surface, or between the skin

surface and the lysine oxidase, or, alternatively, the suspension in which the microparticles or agents are provided. Preferably, "contacting" embraces placing, as an example, the agents, conjugates or microparticles in close enough proximity to the skin to allow for their attachment to the skin via their reactive groups. Agents, conjugates and microparticles may be applied to the skin alone, or alternatively, they may be provided together with a pharmaceutically acceptable carrier. In some embodiments, the agents, conjugates and microparticles can be provided in a formulation commonly intended for application to an external surface, such as a lotion, gel, ointment, jelly, cream, shampoo, detergent or spray (e.g., aerosol). In particular embodiments, the agents, conjugates and microparticles may be provided together with lysine oxidase.

After contacting the agents, conjugates or microparticles with, for example, the skin surface, it is necessary to allow the agents, conjugates or microparticles to remain in contact with the skin surface for a time sufficient to permit a layer of agents, conjugates or microparticles to covalently attach to the reactive groups (e.g., aldehydes) of the tissue. When the agents, conjugates or microparticles are contacted with the skin surface they generally will distribute randomly throughout a volume above the skin surface, or if small enough in size, throughout a volume under the outermost layer of skin. This will also be the case should the agents, conjugates or microparticles be provided in a topical formulation such as an ointment. Not all the agents, conjugates or microparticles will contact the skin surface initially, however with time, a sufficient number of agents, conjugates or microparticles will settle closer to the skin surface until the point where their reactive groups will react with corresponding active groups on the skin, resulting in a covalent bond that tethers the agents, conjugates or microparticles to the skin. If the agents, conjugates or microparticles of small enough, they will distribute randomly below the outermost layer of skin and preferably in proximity to, but not within, the layer of living skin cells. As an example, a "sufficient number of microparticles" is that number required to provide an effective amount of the active agent to the tissue (e.g., the skin surface).

The agents, conjugates or microparticles, whether applied to the tissue in an isolated form or as part of a formulation, are allowed to settle towards the tissue and thereby form a layer. A layer of agents, conjugates or microparticles is that amount and distribution of agents, conjugates or microparticles that is enough to provide distribution of active agent to the skin in amounts sufficient to achieve the prophylactic, therapeutic or cosmetic purpose of

the agent. The agents, conjugates or microparticles need not be evenly adjacent to one another in the layer, nor must they be in the same plane (as described herein) provided their distribution above, within or below the outermost layer of skin allows the active agent to be distributed sufficiently. As an example, when the active agent is a sunscreen, it is desirable that it be applied uniformly distributed over an entire area of skin in order to provide maximal effect. It may not be necessary, however, that the sunscreen containing conjugates or microparticles be physically touching each other, provided each conjugate or microparticle is capable of providing sufficient amounts of sunscreen for a particular surface area. As a further example, if the active agent is a cosmetic, it may be desirable to form a layer of agents, conjugates or microparticles over a defined surface area in order to provide the cosmetic solely to the discrete area. The layer of agents, conjugates or microparticles may be a volume of space over the tissue occupied by the agents, conjugates or microparticles. The agents, conjugates or microparticles may be, but need not be, in a planar arrangement. By a planar arrangement, it is meant that the agents, conjugates or microparticles are equidistant from the surface of the tissue. Conversely, a non-planar arrangement indicates that the agents, conjugates or microparticles are differentially spaced away from the surface of the tissue. The distance of the agents, conjugates or microparticles from the surface of the tissue may depend upon the location of the reactive groups which have covalently linked to the tissue. If these are located on long pendent chains, the agents, conjugates or microparticles may not be contacting the tissue surface at all.

If the method relies on the activity of endogenous lysine oxidase alone, then only the agents, conjugates or microparticles need be applied to the skin surface. However, if the method requires the use of exogenous lysine oxidase, then both agents, conjugates or microparticles, and exogenous lysine oxidase are applied to the skin surface and allowed to remain in contact with the skin for a time sufficient to permit the layer of agents, conjugates or microparticles to covalently attach to the skin.

The lysine oxidase may be added before, simultaneously with, or after the agents, conjugates or microparticles. It is to be understood that the lysine oxidase may also act on the agents, conjugates or microparticles, rather than the tissue, and so may additionally be premixed with the agents, conjugates or microparticles and then applied with the agents, conjugates or microparticles to the tissue.

In some embodiments, it may be desired that the conjugates and microparticles penetrate the skin up to but not into the layer of living cells. In some embodiments, it is desired that the agents enter the layer of living cells. Thus, rather than being located on the skin surface, the agents, conjugates or microparticles may be located within the skin surface. In these latter embodiments, it may also be desirable to use microparticles which possess both lysine and amine or aldehyde reactive groups. Once the microparticles enter the layer of living cells and are exposed to lysine oxidase, they are likely to crosslink with each other (i.e., covalent bonds may be formed between lysine oxidase products on one microparticle and amines or aldehydes on another). The crosslinked microparticles may then become so large that they are unable to exit the layer of living cells and are thus retained in this layer. The lysine oxidase may be endogenous or exogenous. If exogenous, it may be preferred that the microparticles be applied to the tissue (e.g., the skin) prior to the lysine oxidase. In embodiments relying on microparticle penetration of the outermost surface of the skin, the microparticles are preferably small enough in size to do so (e.g., less than 100 μm). In some embodiments, the microparticles may be those which degrade following the treatment period.

If the microparticles are provided to the skin surface as part of a formulation such as those listed above, it is important that the majority of the active agent does not exit (i.e., leach) from the microparticle and into the formulation prior to contact with the skin. Preferably, the active agent is not substantially soluble in the formulation. Instead, the agent will exit the microparticle only upon contact with the skin. This may occur if, for example, the active agent is specifically soluble at higher temperatures (such as at the skin surface), or in the bodily secretions at the skin surface. Alternatively, the microparticle may be made from substances which are temperature or environment sensitive, so that contact with the skin but not necessarily with the formulation induces their disintegration and the subsequent release of the active agent. Thermosensitive polymers in the form of poly(ether-ester) block copolymers are reported by Cha et al., in U.S. Patent 5,702,717.

The agents, conjugates, and microparticles of the invention may optionally be combined with a pharmaceutically-acceptable carrier to form a pharmaceutical preparation. The term "pharmaceutically-acceptable carrier" as used herein means one or more compatible solid or liquid filler, diluents or encapsulating substances which are suitable for administration into a human. The term "carrier" denotes an organic or inorganic ingredient, natural or synthetic, with which the active ingredient is combined to facilitate the application.

The components of the pharmaceutical compositions also are capable of being commingled with the agents of the present invention, and with each other, in a manner such that there is no interaction which would substantially impair the desired pharmaceutical efficacy.

When administered, the pharmaceutical preparations of the invention are applied in pharmaceutically-acceptable amounts and in pharmaceutically-acceptably compositions. Such preparations may routinely contain salt, buffering agents, preservatives, compatible carriers, and optionally other therapeutic agents. When used in medicine, the salts should be pharmaceutically acceptable, but non-pharmaceutically acceptable salts may conveniently be used to prepare pharmaceutically-acceptable salts thereof and are not excluded from the scope of the invention. Such pharmacologically and pharmaceutically-acceptable salts include, but are not limited to, those prepared from the following acids: hydrochloric, hydrobromic, sulfuric, nitric, phosphoric, maleic, acetic, salicylic, citric, formic, malonic, succinic, and the like. Also, pharmaceutically-acceptable salts can be prepared as alkaline metal or alkaline earth salts, such as sodium, potassium or calcium salts.

The compositions and pharmaceutical preparations of agents, conjugates or microparticles may be administered in effective amounts. An effective amount, in general, means that amount necessary to achieve the purpose for which the active agent is applied. The effective amount will depend upon the mode of administration, the particular condition being treated, the severity of the condition, the needs of the patient, and the desired outcome. It will also depend upon, as discussed above, the stage of the condition, the age and physical condition of the subject, frequency of treatment and mode of treatment, the nature of concurrent therapy, if any, and like factors well known to the medical practitioner. If the active agent is a pharmaceutical agent, then the amount is that amount necessary to delay the onset of, slow the progression of, halt altogether the onset or progression of, or diagnose a particular condition being treated. In the case of a cosmetic agent, the effective amount will be that amount necessary to achieve the desired cosmetic result. In the case of a sunscreen agent, an effective amount will be that amount necessary to achieve suitable protection from the sun as is conventional.

While not wishing to be bound by any theory of the invention, it is believed that the lysine oxidase acts on the tissue to convert lysine amines to lysine aldehydes. The lysine aldehydes then are available to react (without further exogenous assistance or treatment) with amines and aldehydes which are the reactive groups appended to the agents or microparticles.

The effect of the addition of lysine oxidase could be examined by tissue section, by dyes, in vitro, etc., but the practical effect can be determined by presence of the agents or microparticles over an extended period of time, reflecting covalent attachment of the agent (or microparticle) to the body tissue (e.g., the skin). As will be recognized by those of ordinary skill in the art, the extent of attachment will be affected not only by the concentration, amounts, etc. of the lysine oxidase, but also by the concentrations, amounts, surface availabilities (in the case of microparticles), etc. of the reactive groups. Effective amounts, ultimately, will be determined by the combination of these factors together with the parameters described above, such as agent selection, condition being treated, mode of administration and the like. These factors can be manipulated and optimized by those of ordinary skill in the art with no more than routine experimentation.

The mode of delivery typically will be topical. Other modes of delivery are, nonetheless, appropriate depending on the condition being treated. Aerosols are an example of an appropriate mode of delivery.

Generally, doses of active compounds of the present invention would be from about 0.01 mg/kg per day to 1000 mg/kg per day. It is expected that doses ranging from 1-500 mg/kg, and preferably doses ranging from 1-100 mg/kg, and even more preferably doses ranging from 1-50 mg/kg, will be suitable. A variety of administration routes are available, although topical routes are preferred. The methods of the invention, generally speaking, may be practiced using any mode of administration that is medically acceptable, meaning any mode that produces effective levels of the active compounds without causing clinically unacceptable adverse effects. Such modes of administration include oral, rectal, topical, nasal or interdermal routes.

The active agents, the microparticles and the formulations in which they are provided can be in solid, semi-solid or liquid form. Solid forms include for example, powders, granules and flakes. Semi-solid forms include, for example, gels, creams, gelatins and ointments. Formulations for topical administration are known to those of ordinary skill in the art and, in most cases, are commercially available from suppliers such as Paddock Laboratories and Gallipot. Information on topically active and inactive agents, and their commercial suppliers is available from various trade manuals, most particularly, Remington's Pharmaceutical Sciences, United States Pharmacopoeia (USP), National Formulary (NF), Merck Index, Physician's Desk Reference (PDR) and Chemical Abstracts.

The invention also provides kits. Referring to an exemplary kit in Figure 1, the kit is a package 10 comprising a housing 12 holding a first container 14, a second container 16 and a third container 18. The kits optionally may be comprised of a single container which houses the agent, conjugate, or microparticle compositions described above, either alone, in a pharmaceutically acceptable carrier or in a topically applied formation. The kit may alternatively contain more than one container in which case they are provided in a package which houses the containers. A second container may be provided which contains lysine oxidase. A third container may also be provided which contains, for example, a linking molecule for preparing the surface of the body tissue for application of the agent, conjugate, or microparticle. The various containers may also contain cleansers for the skin, catalysts, preservatives, buffers, vehicles, and the like, as is conventional. The kit also houses instructions for using the materials according to the invention, particularly for the topical administration of the agents, conjugates, or microparticles. The instructions may be provided separately from the containers (e.g., on a sheet of paper enclosed in the kit) or on one of the containers (e.g., text on the outside surface of a container).

In one embodiment, the kit contains lysine oxidase.

The lysine oxidase may be exogenously added lysine oxidase or may be endogenous lysine oxidase present at the tissue.

The agent may be a sunscreen agent. Examples of sunscreen agents include: p-aminobenzoate analogs such as 2-ethylhexyl-4-dimethylaminobenzoate (Padimate O); p-methoxy-2-ethyl-hexyl-cinnamate (Parsol 1789); oxybenzone (benzophenone-3); ethylhexylsalicylate; diphenylacrylate polyisobutylene; alkyl-β,β-diphenylacrylate and α-cyano-β,β-diphenylacrylate;1-(4-aminophenyl)-2-morpholinylethanone; (1-(4-methoxylphenyl)-3-(4-tert-butyl-phenyl)-propan-1-3-dione; methyl anthranilate; octocrylene; Tretinoin α-hydroxyacid; diphenylacrylate polyisobutylene; 1-(4-aminophenyl)-2-morpholinylethanone; diphenylacrylate polyisobutylene; digalloyl trioleate; glyceryl p- aminobenzoate; 4-(omega -dialkylaminoalkoxy)phenylmethylene)-1,3,3-trimethyl-2-oxabicyclo(2.2.2)octan-6-ones; 5-(arylmethylene)-1,3,3-trimethyl-2-oxabicyclo(2.2.2)octan-6-ones; melanin.

Further examples of sunscreen agents include: 3-benzylidene camphor; 4-methylbenzylidene camphor; allantoin PABA benzalphthalide; benzophenone; benzophenone-1; benzophenone-10; benzophenone-11; benzophenone-12; benzophenone-2; benzophenone-3; benzophenone-4; benzophenone-5; benzophenone-6; benzophenone-7; benzophenone-8; benzophenone-9; benzyl salicylate; benzylidene camphor sulfonic acid; bornelone; bumetrizole; butyl methoxydibenzoylmethane; camphor benzalkonium methosulfate; cinoxate; DEA-methoxycinnamate; diisopropyl methyl cinnamate; dimethyl PABA ethyl cetearyldimonium tosylate; drometrizole; ethyl cinnamate; ethyl dihydroxypropyl PABA; ethyl diisopropylcinnamate; ethyl methoxycinnamate; ethyl urocanate; etocrylene; glyceryl octanoate dimethoxycinnamate; glyceryl PABA; glycol

salicylate; homosalate; isoamyl p-methoxycinnamate; isopropyl dibenzoylmethane; isopropyl methoxycinnamate; isopropylbenzyl salicylate; menthyl anthranilate; menthyl salicylate; n-ethyl-3-nitro PABA; octocrylene; octrizole; octyl dimethyl PABA; octyl methoxycinnamate; octyl salicylate; octyl triazone; PABA; PEG-25 PABA; phenylbenzimidazole sulfonic acid; polyacrylamidomethyl benzylidene camphor; potassium methoxycinnamate; potassium phenylbenzimidazole sulfonate; red petrolatum; sodium phenylbenzimidazole sulfonate; TEA-phenylbenzimidazole sulfonate; TEA-salicylate; terephthalylidene dicamphor sulfonic acid; tripaba panthenol; urocanic acid.

Further examples of compounds which are suitable sunscreen agents include: derivatives of para-amine benzoic acid (PABA); salicylates; cinnamates; benzophenones; camphors;4-aminobenzoic acid; N,N,N-trimethyl-4-(2-oxoborn-3-ylidenemethyl) anilinium methyl sulphate; homosalate (INN); oxybenzone (INN); 2-phenylbenzimidazole-5-sulphonic acid and its potassium, sodium and triethanolamine salts; 3,3'-(1,4-phenylenedimethylene) bis (7,7-dimethyl-2-oxobicyclo-[2.2.1] hept-1-ylmethanesulphonic acid) and its salts; 1-(4-tert-butylphenyl)-3-(4-methoxyphenyl) propane-1,3-dione; alpha-(2-oxoborn-3-ylidene) toluene-4-sulphonic acid and its salts; 2-cyano-3,3-diphenyl acrylic acid, 2-ethylhexyl ester (octocrylene); polymer of N-{(2 and 4)-[(2-oxoborn-3-ylidene)methyl] benzyl}acrylamide; octyl methoxycinnamate; ethoxylated ethyl-4-aminobenzoate (PEG-25 PABA); isopentyl-4-methoxycinnamate (isoamyl p-methoxycinnamate); 2,4,6-trianilino-(p-carbo-2ethylhexyl-l'-oxy)-1,3,5-triazine (octyl triazone); phenol 2-(2h-benzotriazol-2-yl)-4-methyl-6-(2-methyl-3-(1,3.3,3-tetramethyl-1-(trimethylsilyl)oxy)-disiloxanyl)propyl) (drometrizole trisiloxane); 3-(4'-methylbenzylidene)-d-1 camphor (4-methylbenzylidene camphor); 3-benzylidene camphor (3-benzylidene camphor); 2-ethylhexyl salicyclate (octyl-salicylate); 2-ethylhexyl-4-dimethyl-aminobenzoate; 2-hydroxy-4-methoxybenzo-phenone-5-sulphonic acid and sodium salt (sulisobenzone and sulisobenzone sodium); 4-isopropylbenzyl salicylate; cinnamic derivatives, such as, for example, 2-ethylhexyl p-methoxycinnamate; salicylic derivatives, such as, for example, 2-ethylhexyl salicylate; camphor derivatives, such as, for example, (4-methylbenzylidene)camphor or benzene-1,4-di(3-methylidene-10-camphorsulfonic) acid; benzimidazole derivatives, such as 2-phenylbenzimidazole-5-sulfonic acid; benzophenone derivatives, such as 2-hydroxy-4-methoxybenzophenone; dibenzoylmethane derivatives, such as 4-tert-butyl-4'-methoxydibenzoylmethane, or β,β-diphenylacrylate derivatives, such as 2-ethylhexyl α-cyano-β,β-diphenylacrylate; p-aminobenzoic acid, cinoxate, diethanolamine, p-methoxycinnamate, digalloyl trioleate, dioxybenzone, ethyl 4-›bis›hydroxypropyl!aminobenzoate, 2-ethylhexyl 2-cyano-3,3-diphenylacrylate, ethylhexyl p-methoxycinnamate, 2-ethyhexyl salicylate, glyceryl aminobenzoate, homosalate (3,3,5-trimethylcyclohexylsalicylate), lawsone (2-hydroxy-1,4-naphthoquinone) with or without dihydroxyacetone, methyl anthranilate, oxybenzone, Padimate A, Padimate 0, 2-phenylbenzimidazole-5-sulfonic acid, triethanolamine salicylate, red petrolatum, and suisobenzone; titanium dioxide or zinc oxide.

The agent may also be a cosmetic agent. Examples of cosmetic components include: Vitamin C; Alpha -tocopherol (Vit. E analog); Ammonium lauryl Sulfate; Cocamidopropyl Betaine; Lauramide DEA; Cocamide DEA; Methyl paraben; Propyl paraben; Butyl paraben; Salicylic acid; Propylene glycol; EDTA; BHT; BHA; TBHQ; DMDM hydantoin; Imidazolidinyl urea; Potassium sorbate; Sodium Benzoate; phenoxyethanol; Polysorbate 20 and 80; Sodium laurylether sulfate; Oleyl betaine; Tego betaine; Sorbitol; Glycerin monolaurate; Glycerol stearate.

The agent may also be a coloring agent for coloring hair or skin. A coloring agent is one which is able to change the color of skin, hair or nails. Color change may be effected through for example, a lightening or darkening of skin, hair or nails. Examples of coloring agents for hair include: 1,2,4-benzenetriacetate; 1,2,4-trihydroxybenzene; 1,3-bis-(2,4-diaminophenoxy)propane; 1,5-naphthalenediol; 1-naphthol; 2,3-naphthalenediol; 2,4-diamino-5-methylphenetol HCl; 2,4-diamino-5-methylphenoxyethanol HCl; 2,4-diaminodiphenylamine; 2,4-diaminophenol; 2,4-diaminophenol HCl; 2,4-diaminophenoxyethanol HCl; 2,6-bis(2-hydroxyethoxy)-3,5-pyridinediamine HCl; 2,6-diaminopyridine; 2,6-dimethoxy-3,5-pyridinediamine HCl; 2,7-naphthalenediol; 2-amino-3-hydroxypyridine; 2-amino-3-nitrophenol; 2-amino-4-hydroxyethylaminoanisole; 2-amino-4-hydroxyethylaminoanisole sulfate; 2-amino-6-chloro-4-nitrophenol; 2-aminomethyl-p-aminophenol HCl; 2-chloro-5-nitro-n-hydroxyethyl p-phenylenediamine; 2-chloro-6-ethylamino-4-nitrophenol; 2-chloro-p-phenylenediamine; 2-chloro-p-phenylenediamine sulfate; 2-hydroxyethyl picramic acid; 2-hydroxyethylamino-5-nitroanisole; 2-methoxymethyl-p-aminophenol HCl; 2-methyl-5-hydroxyethylaminophenol; 2-methylresorcinol; 2-nitro-5-glyceryl methylaniline; 2-nitro-n-hydroxyethyl-p-anisidine; 2-nitro-p-phenylenediamine; 3,4-diaminobenzoic acid; 3,4-methylenedioxyaniline; 3,4-methylenedioxyphenol; 3-methylamino-4-nitrophenoxyethanol; 3-nitro-4-aminophenoxyethanol; 3-nitro-p-cresol; 3-nitro-p-hydroxyethylaminophenol; 4,4-diaminodiphenylamine; 4,5-diamino-1-methylpyrazole HCl; 4,6-bis(2-hydroxyethoxy)-m-phenylenediamine HCl; 4-amino-2-hydroxytoluene; 4-amino-2-nitrodiphenylamine-2-carboxylic acid; 4-amino-3-nitrophenol; 4-amino-m-cresol; 4-chlororesorcinol; 4-hydroxyindole; 4-hydroxypropylamino-3-nitrophenol; 4-methoxytoluene-2,5-diamine HCl; 4-nitro-m-phenylenediamine; 4-nitro-o-phenylenediamine; 4-nitro-o-phenylenediamine HCl; 4-nitrophenyl aminoethylurea; 5-amino-2,6-dimethoxy-3-hydroxypyridine; 5-amino-6-chloro-o-cresol; 6-amino-m-cresol; 6-amino-o-cresol; 6-hydroxyindole; 6-methoxy-2,3-pyridinediamine HCl; 6-nitro-2,5-pyridinediamine; 6-nitro-o-toluidine; acacia catechu; acid black 1; acid black 52; acid blue 1; acid blue 3; acid blue 62; acid blue 74; acid blue 9; acid brown 13; acid green 1; acid green 25; acid green 50; acid orange 24; acid orange 3; acid orange 6; acid orange 7; acid red 14; acid red 18; acid red 27; acid red 33; acid red 35; acid red 51; acid red 52; acid red 73; acid red 87; acid red 92; acid red 95; acid violet 43; acid violet 9; acid yellow 1; acid yellow 23; acid yellow 3; acid yellow 73 sodium salt; basic blue 26; basic blue 41; basic blue 6; basic blue 7; basic blue 9; basic blue 99; basic brown 16; basic brown 17; basic brown 4; basic green 1; basic red 2; basic red 22; basic red 76; basic violet 14; basic yellow 11; basic yellow 57; brilliant black 1; chromium hydroxide green; chromium oxide greens; curry red; dihydroxyindole; direct black 51; direct blue 86; direct red 23; direct red 80; direct red 81; direct violet 48; direct yellow 12; disperse black 9; disperse blue 1; disperse blue 3; disperse blue 7; disperse brown 1; disperse orange 3; disperse red 11; disperse red 15; disperse red 17; disperse violet 1; disperse violet 4; fast green FCF; HC blue No. 10; HC blue No. 11; HC blue No. 12; HC blue No. 2; HC blue No. 4; HC blue No. 5; HC blue No. 6; HC blue No. 7; HC blue No. 8; HC blue No. 9; HC brown No. 1; HC brown No. 2; HC green No. 1; HC orange No. 1; HC orange No. 2; HC orange No. 3; HC red No. 1; HC red No. 10; HC red No. 11; HC red No. 13; HC red No. 3; HC red No. 7; HC red No. 8; HC red No. 9; HC violet No. 1; HC violet No. 2; HC yellow No. 10; HC yellow No. 11; HC yellow No. 12; HC yellow No. 13; HC yellow No. 2; HC yellow No. 4; HC yellow No. 5; HC yellow No. 6; HC yellow No. 7; HC yellow No. 8; HC yellow No. 9; henna;

hydroquinone; hydroxyanthraquinoneaminopropyl methyl morpholinium methosulfate; hydroxybenzomorpholine; hydroxyethyl-2,6-dinitro-p-anisidine; hydroxyethyl-2-nitro-p-toluidine; hydroxyethyl-3,4-methylenedioxyaniline HCl; hydroxyethyl-p-phenylenediamine sulfate; hydroxyethylaminomethyl-p-aminophenol HCl; hydroxypropyl bis(n-hydroxyethyl-p-phenylenediamine) HCl; lawsone; lead acetate; m-aminophenol; m-aminophenol HCl; m-aminophenol sulfate; m-phenylenediamine; m-phenylenediamine sulfate; N,N-bis(2-hydroxyethyl)-p-phenylenediamine sulfate; N,N-diethyl-m-aminophenol; N,N-diethyl-m-aminophenol sulfate; N,N-dimethyl 2,6-pyridinediamine HCl; N,N-dimethyl-p-phenylenediamine; N,N-dimethyl-p-phenylenediamine sulfate; N,N-bis(2-hydroxyethyl)-2-nitro-p-phenylenediamine;N,N-dimethyl-n-hydroxyethyl-3-nitro-p-phenylendiamine; n-ethyl-3-nitro PABA; n-methoxyethyl-p-phenylenediamine HCl; n-methyl-3-nitro-p-phenylenediamine; n-phenyl-p-phenylenediamine; n-phenyl-p-phenylenediamine HCl; n-phenyl-p-phenylenediamine sulfate; o-aminophenol; p-aminophenol; p-aminophenol HCl; p-aminophenol sulfate; p-methylaminophenol; p-methylaminophenol sulfate; p-phenylenediamine; p-phenylenediamine HCl; p-phenylenediamine sulfate; phenyl methyl pyrazolone; phloroglucinol; picramic acid; pigment blue 15; pigment green 7; pigment red 112; pigment red 172 aluminum lake; pigment red 4; pigment red 48; pigment red 5; pigment red 57; pigment red 57:1; pigment red 63:1; pigment red 64:1; pigment red 83; pigment red 90:1 aluminum lake; pigment violet 19; pigment violet 23; pigment yellow 12; pigment yellow 13; pigment yellow 73; ponceau sx; resorcinol; silver nitrate; sodium picramate; solvent black 3; solvent green 3; solvent green 7; solvent orange 1; solvent red 1; solvent red 23; solvent red 3; solvent red 43; solvent red 48; solvent red 72; solvent red 73; solvent violet 13; solvent yellow 29; solvent yellow 33; solvent yellow 44; sunset yellow; thymol; toluene-2,5-diamine; toluene-2,5-diamine sulfate; toluene-3,4-diamine; ultramarines; VAT red 1; m- and p-phenylenediamines, their N-substituted derivatives and their salts; N-substituted derivatives of o-phenylenediamines; methylphenylenediamines, their N-substituted derivatives and their salts; diaminophenols; hydroquinone; alpha-naphthol; lead acetate.

Coloring agents also include bleaching agents such as ammonium persulfate; hydroquinone and strontium dioxide.

Other examples of coloring agents are cosmetic colorants which include: acid red 195; aluminum stearate; anthocyanins; beta vulgaris; beta vulgaris; bismuth oxychloride; bromocresol green; bromothymol blue; calcium stearate; capsanthin/capsorubin caramel; CI 10006; CI 10020; CI 10316; CI 10316; CI 11680; CI 11710; CI 11725; CI 11920; CI 12010; CI 12085; CI 12120; CI 12150; CI 12370; CI 12420; CI 12480; CI 12490; CI 12700; CI 13015; CI 14270; CI 14700; CI 14700; CI 14720; CI 14815; CI 15510; CI 15510; CI 15525; CI 15580; CI 15620; CI 15630; CI 15800; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15850; CI 15865; CI 15865; CI 15880; CI 15980; CI 15985; CI 15985; CI 16035; CI 16185; CI 16185; CI 16230; CI 16255; CI 16290; CI 17200; CI 17200; CI 18050; CI 18130; CI 18690; CI 18736; CI 18820; CI 18965; CI 19140; CI 19140; CI 19140; CI 20040; CI 20170; CI 20470; CI 21100; CI 21108; CI 21230; CI 24790; CI 26100; CI 27290; CI 27755; CI 28440; CI 40215; CI 40800; CI 40820; CI 40825; CI 40850; CI 42045; CI 42051; CI 42053; CI 42080; CI 42090; CI 42090; CI 42090; CI 42100; CI 42170; CI 42510; CI 42520; CI 42735; CI 44045; CI 44090; CI 45100; CI 45190; CI 45220; CI 45350; CI 45350; CI 45370; CI 45370; CI 45370; CI 45370; CI 45380; CI 45380; CI 45380; CI

45380; CI 45396; CI 45405; CI 45410; CI 45410; CI 45410; CI 45410; CI 45410; CI 45410; CI 45410; CI 45425; CI 45425; CI 45425; CI 45430; CI 45430; CI 47000; CI 47005; CI 47005; CI 50325; CI 50420; CI 51319; CI 58000; CI 59040; CI 60724; CI 60725; CI 60730; CI 61565; CI 61570; CI 61585; CI 62045; CI 69800; CI 69825; CI 71105; CI 73000; CI 73015; CI 73015; CI 73360; CI 73385; CI 73900; CI 73915; CI 74100; CI 74160; CI 74180; CI 74260; CI 75100; CI 75120; CI 75125; CI 75130; CI 75135; CI 75170; CI 75300; CI 75470; CI 75810; CI 75810; CI 75810; CI 75810; CI 77000; CI 77002; CI 77004; CI 77004; CI 77004; CI 77007; CI 77015; CI 77120; CI 77163; CI 77220; CI 77231; CI 77266; CI 77267; CI 77268:1; CI 77288; CI 77289; CI 77346; CI 77400; CI 77480; CI 77489; CI 77491; CI 77492; CI 77499; CI 77510; CI 77713; CI 77742; CI 77745; CI 77820; CI 77891; CI 77947; lactoflavin; magnesium stearate; riboflavin and zinc stearate.

The agent may also be a moisturizing agent. A moisturizing agent is an agent which softens and smoothens skin and in some instances hair. Some moisturizing agents are also humectants in that they are able to hold and retain moisture. Emollient agents can be moisturing agents. Moisturizing agents can be used soften skin prior to abrasive events such as shaving. In these latter embodiments, the composition of the invention comprising a moisturizing agent can be supplied in a shaving gel or creme. Examples of moisturizing agents include: proteoglycans and glycosaminoglycans including hyaluronic acid, crosslinked hyaluronic acid, derivatized hyaluronic acid, chondroitin sulfate; mono- and poly-hydroxyl containing chemicals such as glycerin, sorbitol; pyrrolidine carboxylic acid; proteins such as hydrolyzed animal and vegetable protein, collagens, derivatized collagens, elastins; allantoin; polymer skin conditioning agents; polyols such as glycerol; chitosans; derivatized chitosans; and polylysine.

Other examples of moisturizing agents include D,L-panthenol, D-panthenol, vitamin A palmitate, vitamin E acetate, methylsilanetriol mannuronate, natural oils such as tallow oil, macadamia nut oil, borage oil, evening primrose oil, kukui nut oil, rice bran oil, tea tree oil, a medium chain fatty acid ester of glycerol, such as glycerol triheptanoate, glyceryl trioctanoate, glycerol trioctanoate, mineral water, silicones, silicone derivatives; allantoin; dipotassium glycyrrhizinate; stearyl glycyrrhizinate; squalane NF; squalane EX; cetyl ester wax; orange roughy oil; hydrogenated phospholipids; hydrocarbon oils and waxes, such as mineral oil, polyethylene and paraffin; triglyceride esters, such as olive oil, avocado oil, and squalene; lanolin and derivatives; ether-esters, such as fatty acid esters of ethoxylated fatty alcohols; and fatty acids having 10 to 20 carbon atoms, such as lauric, myristic, oleyl, and stearate.

Emollients useful in the invention as moisturizers include: acetamidoethoxybutyl trimonium chloride; acetyl trioctyl citrate; acetylated castor oil; acetylated cetyl hydroxyprolinate; acetylated glycol stearate; acetylated hydrogenated cottonseed glyceride; acetylated hydrogenated lanolin; acetylated hydrogenated lard glyceride; acetylated hydrogenated tallow glyceride; acetylated hydrogenated tallow glycerides; acetylated hydrogenated vegetable glyceride; acetylated lanolin; acetylated lanolin alcohol; acetylated lanolin ricinoleate; acetylated lard glyceride; acetylated palm kernel glycerides; acetylated sucrose distearate; adeps bovis; adeps suillus; aleurites moluccana; allyl caproate;almond oil peg-6 esters; aloe barbadensis; althea officinalis; aluminum hydroxide; aluminum stearates; aluminum tristearate; amodimethicone/dimethicone copolyol; amp-isostearoyl hydrolyzed collagen; anacardium occidentale; apple peel wax; apricot kernel oil PEG-6 esters; arachidonic acid; arachidyl alcohol; arachidyl behenate; arachidyl glycol isostearate; arachidyl propionate;

arachis hypogaea; arctium lappa; avena sativa; avocado oil PEG-11 esters; bassia latifolia; batyl alcohol; batyl isostearate; batyl stearate; bayberry wax; behenoxy dimethicone; behenyl/isostearyl beeswax; behenyl alcohol; behenyl behenate; behenyl erucate; behenyl isostearate; benzyl laurate; bis-diglyceryl/caprylate/ caprate/isostearate/hydroxystearate adipate; bis-diglyceryl caprylate/caprate/isostearate/ stearate/hydroxystearate adipate; bisphenylhexamethicone; borago officinalis; borago officinalis; brassica botrytis; brassica oleifera; brassica oleifera; brevoortia; bubulum; butyl acetyl ricinoleate; butyl isostearate; butyl myristate; butyl oleate; butyl stearate; butylene glycol dicaprylate/dicaprate; butylene glycol montanate; butyloctyl beeswax; butyloctyl oleate; butyrospermum parkii; butyroyl trihexyl citrate; butyrum; buxus chinensis; C10-18 triglycerides; C11-15 pareth-12 stearate; C11-15 pareth-3 oleate; C11-15 pareth-3 stearate; C12-13 alcohols; C12-13 alkyl lactate; C12-13 alkyl octanoate; C12-15 alcohols; C12-15 alkyl benzoate; C12-15 alkyl lactate; C12-15 alkyl octanoate; C12-15 pareth-12 oleate; C12-16 alcohols; C12-18 acid triglyceride; C13-14 isoparaffin; C15-18 glycol; C18-28 alkyl acetate; C18-36 acid glycol ester; C18-36 acid triglyceride; C18-38 alkyl beeswax; C18-70 isoparaffin; C20-40 alkyl behenate; C20-40 isoparaffin; C24-28 alkyl methicone; C30-45 alkyl methicone; C9-11 alcohols; Calendula officinalis; camelina sativa; cananga odorata; candelilla cera; canola; capryl glycol; caprylic/capric/diglyceryl succinate; caprylic/capric/lauric triglyceride; caprylic/capric/linoleic triglyceride; caprylic/capric/myristic/stearic triglyceride; caprylic/capric/stearic triglyceride; caprylic/capric glycerides; caprylic/capric triglyceride; carnauba; carthamus tinctorius; carthamus tinctorius; cera alba; ceratonia siliqua; ceratonia siliqua; cetearyl alcohol; cetearyl behenate; cetearyl candelillate; cetearyl isononanoate; cetearyl octanoate; cetearyl palmitate; cetyl acetate; cetyl acetyl ricinoleate; cetyl alcohol; cetyl C12-15-pareth-9 carboxylate; cetyl caprylate; cetyl dimethicone; cetyl esters; cetyl glycol; cetyl glycol isostearate; cetyl isononanoate; cetyl lactate; cetyl laurate; cetyl myristate; cetyl octanoate; cetyl oleate; cetyl palmitate; cetyl ricinoleate; cetyl stearate; cetylarachidol; chamomilla recutita; chimyl isostearate; cholesterol; cholesteryl hydroxystearate; cholesteryl isostearate; cholesteryl macadamiate; cholesteryl nonanoate; cholesteryl stearate; cistus ladaniferus; cocaminobutyric acid; cocaminopropionic acid; coco-caprylate/caprate; coco-rapeseedate; cocoglycerides; coconut acid; coconut alcohol; cocos nucifera; cocoyl glutamic acid; coenzyme a; corn acid; corn oil PEG-6 esters; corn oil PEG-8 esters; corylus americana; corylus avellana; cottonseed acid; cottonseed glyceride; cucumis sativus; cucurbita pepo; curcuma zedoaria; cyatheaceae; cyclomethicone; dalea spinosa; daucus carota; decyl alcohol; decyl isostearate; decyl myristate; decyl oleate; decyl succinate; decyltetradecanol; di-C12-13 alkyl malate; di-C12-13 alkyl tartrate; di-C12-15 alkyl adipate; dibutyl adipate; dibutyl sebacate; dicapryl adipate; dicaprylyl maleate; dicetyl adipate; dicocamine; dicocodimethylamine dilinoleate; dicocoyl pentaerythrityl distearyl citrate; didecene; diethyl palmitoyl aspartate; diethyl sebacate; diethyl succinate; diethylene glycol dibenzoate; diethylene glycol diisononanoate; diethylene glycol dioctanoate; diethylene glycol dioctanoate/diisononanoate; dihexyl adipate; dihydroabietyl behenate; dihydrocholesterol; dihydrocholesteryl octyldecanoate; dihydrogenated tallow phthalate; dihydrophytosteryl octyldecanoate; dihydroxyethyl soyamine dioleate; dihydroxyethylamino hydroxypropyl oleate; diisobutyl adipate; diisocetyl adipate; diisodecyl adipate; diisononyl adipate; diisopropyl adipate; diisopropyl dimer dilinoleate; diisopropyl sebacate; diisostearyl adipate; diisostearyl dimer dilinoleate; diisostearyl fumarate; diisostearyl glutarate; diisostearyl malate; dilaureth-7 citrate; dilauryl citrate; dilinoleic acid; dimethicone; dimethicone copolyol; imethicone copolyol almondate; dimethicone copolyol avocadoate; dimethicone copolyol beeswax; dimethicone copolyol cocoa butterate;

dimethicone copolyol olivate; dimethicone copolyol phthalate; dimethicone copolyol shea butterate; dimethicone propylethylenediamine behenate; dimethiconol; dimethiconol hydroxystearate; dimethiconol isostearate; dimethiconol stearate; dimethyl adipate; dimethyl lauramine dimer dilinoleate; dimethyl lauramine isostearate; dimethyl maleate; dimethyl succinate; dimethyl tallowamine; dioctyl adipate; dioctyl dimer dilinoleate; dioctyl malate; dioctyl sebacate; dioctyl succinate; dioctylcyclohexane; dioctyldodecyl dimer dilinoleate; dipentaerythrityl hexaheptanoate/hexacaprylate/hexacaprate dipropyl adipate; dipropylene glycol dibenzoate; distearyldimethylamine dilinoleate; ditridecyl adipate; ditridecyl dimer dilinoleate; dodecyltetradecanol; dromiceius; elaeis guineensis; elaeis guineensis; epoxidized soybean oil; erucyl arachidate; erucyl erucate; erucyl oleate; ethiodized oil; ethyl arachidonate; ethyl avocadate; ethyl ester of hydrolyzed animal protein; ethyl isostearate; ethyl laurate; ethyl linoleate; ethyl linolenate; ethyl minkate; ethyl morrhuate; ethyl myristate; ethyl oleate; ethyl olivate; ethyl palmitate; ethyl pelargonate; ethyl persate; ethyl stearate; fish glycerides; gadi iecur; glycereth-7 triacetate; glycerin/oxybutylene copolymer stearyl ether; glyceryl/sorbitol oleate/hydroxystearate; glyceryl abietate; glyceryl adipate; glyceryl arachidate; glyceryl arachidonate; glyceryl behenate; glyceryl caprate; glyceryl caprylate; glyceryl caprylate/caprate; glyceryl cocoate; glyceryl diarachidate; glyceryl dibehenate; glyceryl dierucate; glyceryl dihydroxystearate; glyceryl diisopalmitate; glyceryl diisostearate; glyceryl dilaurate; glyceryl dilinoleate; glyceryl dimyristate; glyceryl dioleate; glyceryl dipalmitate; glyceryl dipalmitoleate; glyceryl diricinoleate; glyceryl distearate; glyceryl erucate; glyceryl hydroxystearate; glyceryl isostearate; glyceryl lanolate; glyceryl laurate; glyceryl laurate/oleate; glyceryl linoleate; glyceryl linolenate; glyceryl myristate; glyceryl octanoate/stearate/adipate; glyceryl oleate; glyceryl palmitate; glyceryl palmitate/stearate; glyceryl palmitate lactate; glyceryl ricinoleate; glyceryl sesquioleate; glyceryl stearate; glyceryl stearate citrate; glyceryl stearate diacetate; glyceryl stearate lactate; glyceryl triacetyl hydroxystearate; glyceryl triacetyl ricinoleate; glycine soja; glycine soja; glycol/butylene glycol montanate; glycol cetearate; glycol dibehenate; glycol dilaurate; glycol dioctanoate; glycol dioleate; glycol distearate; glycol ditallowate; glycol hydroxystearate; glycol oleate; glycol ricinoleate; glycol stearate; glycosaminoglycans; glycosphingolipids; gossypium; helianthus annus; helianthus annuus; heptylundecanol; hexadecyl methicone; hexamethyldisiloxane; hexanediol distearate; hexyl isostearate; hexyl laurate; hexyldecyl oleate; hordeum vulgare; hordeum vulgare; hydrogenated butylene/ethylene/styrene copolymer; hydrogenated C12-18 triglycerides; hydrogenated c6-14 olefin polymers; hydrogenated castor oil; hydrogenated castor oil laurate; hydrogenated coco-glycerides; hydrogenated coconut acid; hydrogenated coconut oil; hydrogenated cottonseed glyceride; hydrogenated cottonseed oil; hydrogenated ethylene/propylene/styrene copolymer; hydrogenated fish oil; hydrogenated jojoba oil; hydrogenated jojoba wax; hydrogenated lanolin; hydrogenated lard; hydrogenated menhaden oil; hydrogenated mink oil; hydrogenated olive oil unsaponifiables; hydrogenated orange roughy oil; hydrogenated palm/palm kernel oil PEG-6 esters; hydrogenated palm glyceride; hydrogenated palm glycerides; hydrogenated palm kernel glycerides; hydrogenated palm kernel oil; hydrogenated palm oil; hydrogenated peanut oil; hydrogenated polyisobutene; hydrogenated rapeseed oil; hydrogenated shark liver oil; hydrogenated soy glyceride; hydrogenated soybean glycerides; hydrogenated soybean oil; hydrogenated tallow; hydrogenated tallow acid; hydrogenated tallow alcohol; hydrogenated tallow glyceride; hydrogenated tallow glyceride citrate; hydrogenated tallow glyceride lactate; hydrogenated tallow glycerides; hydrogenated tallow glycerides citrate; hydrogenated vegetable glyceride; hydrogenated vegetable glycerides; hydrogenated vegetable glycerides

phosphate; hydrogenated vegetable oil; hydrolyzed collagen; hydroxylated lanolin; hydroxylated milk glycerides; hydroxyoctacosanyl hydroxystearate; hyptis suaveolens; isatis tinctoria; isoamyl laurate; isobutyl myristate; isobutyl palmitate; isobutyl pelargonate; isobutyl stearate; isobutyl tallowate; isobutylated lanolin oil; isocetyl alcohol; isocetyl behenate; isocetyl isodecanoate; isocetyl linoleoyl stearate; isocetyl myristate; isocetyl palmitate; isocetyl salicylate; isocetyl stearate; isocetyl stearoyl stearate; isodeceth-2 cocoate; isodecyl citrate; isodecyl cocoate; isodecyl hydroxystearate; isodecyl isononanoate; isodecyl laurate; isodecyl myristate; isodecyl neopentanoate; isodecyl octanoate; isodecyl oleate; isodecyl palmitate; isodecyl stearate; isododecane; isododecene; isoeicosane; isohexadecane; isohexyl laurate; isohexyl neopentanoate; isohexyl palmitate; isolauryl behenate; isomerized jojoba oil; isononyl isononanoate; isopropyl arachidate; isopropyl avocadate; isopropyl behenate; isopropyl C12-15-pareth-9 carboxylate; isopropyl hydroxystearate; isopropyl isostearate; isopropyl lanolate; isopropyl laurate; isopropyl linoleate; isopropyl myristate; isopropyl oleate; isopropyl palmitate; isopropyl PPG-2-isodeceth-7 carboxylate; isopropyl ricinoleate; isopropyl stearate; isopropyl tallowate; isopropyl titanium triisostearate; isostearyl alcohol; isostearyl avocadate; isostearyl behenate; isostearyl benzoate; isostearyl erucate; isostearyl glyceryl pentaerythrityl ether; isostearyl isononanoate; isostearyl isostearate; isostearyl lactate; isostearyl myristate; isostearyl neopentanoate; isostearyl octanoate; isostearyl palmitate; isostearyl stearoyl stearate; isotridecyl isononanoate; isotridecyl myristate; jojoba alcohol; jojoba wax; juglans regia; lactis lipida; laneth-10 acetate; laneth-9 acetate; lanolin; lanolin; lanolin acid; lanolin alcohol; lanolin cera; lanolin linoleate; lanolin ricinoleate; lanosterol; lard glycerides; laureth-2 acetate; laureth-2 benzoate; laureth-2 octanoate; lauric/palmitic/oleic triglyceride; lauryl alcohol; lauryl behenate; lauryl cocoate; lauryl glycol; lauryl isostearate; lauryl lactate; lauryl myristate; lauryl oleate; lauryl palmitate; lauryl stearate; lauryldimonium hydroxypropyl hydrolyzed collagen; laurylmethicone copolyol; lavandula hybrida; lecithin; lesquerella fendleri; limnanthes alba; linoleic acid; linolenic acid; linoleyl lactate; linseed acid; linum usitatissimum; macadamia ternifolia; maleated soybean oil; mangifera indica; mango seed oil PEG-70 esters; MEL; methicone; methyl acetyl ricinoleate; methyl caproate; methyl caprylate; methyl caprylate/caprate; methyl cocoate; methyl dehydroabietate; methyl gluceth-20 benzoate; methyl glucose dioleate; methyl glucose laurate; methyl glucose sesquicaprylate/sesquicaprate; methyl glucose sesquicocoate; methyl glucose sesquiisostearate; methyl glucose sesquilaurate; methyl glucose sesquioleate; methyl glucose sesquistearate; methyl hydroxystearate; methyl laurate; methyl linoleate; methyl myristate; methyl oleate; methyl palmitate; methyl pelargonate; methyl ricinoleate; methyl stearate; mink oil PEG-13 esters; moringa pterygosperma; mortierella isabellina; musa sapientum; mustela; mustela; myreth-2 myristate; myreth-3 caprate; myreth-3 laurate; myreth-3 myristate; myreth-3 octanoate; myreth-3 palmitate; myristoyl hydrolyzed collagen; myristyl alcohol; myristyl isostearate; myristyl lactate; myristyl lignocerate; myristyl myristate; myristyl neopentanoate; myristyl octanoate; myristyl propionate; myristyl stearate; neopentyl glycol dicaprate; neopentyl glycol dicaprylate/dicaprate; neopentyl glycol dicaprylate/dipelargonate/dicaprate; neopentyl glycol dioctanoate; nonyl acetate; octacosanyl glycol; octacosanyl glycol isostearate; octyl acetoxystearate; octyl cocoate; octyl hydroxystearate; octyl isononanoate; octyl isopalmitate; octyl isostearate; octyl laurate; octyl myristate; octyl neopentanoate; octyl octanoate; octyl oleate; octyl palmitate; octyl pelargonate; octyl stearate; octyldecanol; octyldodecanol; octyldodecyl behenate; octyldodecyl benzoate; octyldodecyl erucate; octyldodecyl lactate; octyldodecyl myristate; octyldodecyl neodecanoate; octyldodecyl neopentanoate; octyldodecyl octanoate;

octyldodecyl oleate; octyldodecyl ricinoleate; octyldodecyl stearate; octyldodecyl stearoyl stearate; oenothera biennis; olea europaea; olea europaea; oleic/linoleic triglyceride; oleic/palmitic/lauric/myristic/linoleic triglyceride; oleic acid; oleostearine; oleoyl hydrolyzed collagen; oleyl acetate; oleyl alcohol; oleyl arachidate; oleyl erucate; oleyl lactate; oleyl lanolate; oleyl linoleate; oleyl myristate; oleyl oleate; oleyl stearate; olive oil PEG-10 esters; olive oil PEG-6 esters; olus; omental lipids; orange peel wax; orbignya oleifera; oryza sativa; oryza sativa; ovum; ozonized jojoba oil; palm glyceride; palm glycerides; palm kernel acid; palm kernel alcohol; palm kernel glycerides; palm kernel wax; palmitic acid; palmitoyl hydrolyzed collagen; pantethine; papaver orientale; paraffin; paraffinum liquidum; PCA glyceryl oleate; peanut oil PEG-6 esters; PEG/PPG-125/30 copolymer; PEG/PPG-35/9 copolymer; PEG-10 coconut oil esters; PEG-10 hydrogenated lanolin; PEG-10 lanolin; PEG-10 polyglyceryl-2 laurate; PEG-11 castor oil; PEG-2 milk solids; PEG-20 hydrogenated lanolin; PEG-20 methyl glucose distearate; PEG-200 hydrogenated glyceryl palmate; PEG-4 proline linoleate; PEG-4 proline linolenate; PEG-5 glyceryl triisostearate; PEG-5 hydrogenated lanolin; PEG-5 pentaerythrityl ether; PEG-5 tricetyl citrate; PEG-5 tridecyl citrate; PEG-5 trilauryl citrate; PEG-5 trimyristyl citrate; PEG-5 tristearyl citrate; PEG-75 lanolin; PEG-8 hydrogenated fish glycerides; PEG-8 linoleate; PEG-8 linolenate; pellis lipida; pentadecyl alcohol; pentadesma butyracea; pentadoxynol-200; pentaerythrityl dioleate; pentaerythrityl isostearate/caprate/caprylate/adipate; pentaerythrityl stearate; pentaerythrityl stearate/caprate/caprylate adipate; pentaerythrityl tetraabietate; pentaerythrityl tetraacetate; pentaerythrityl tetrabehenate; pentaerythrityl tetrabenzoate; pentaerythrityl tetracaprylate/caprate; pentaerythrityl tetracocoate; pentaerythrityl tetraisononanoate; pentaerythrityl tetraisostearate; pentaerythrityl tetralaurate; pentaerythrityl tetramyristate; pentaerythrityl tetraoctanoate; pentaerythrityl tetraoleate; pentaerythrityl tetrapelargonate; pentaerythrityl tetrastearate; pentaerythrityl trioleate; pentahydrosqualene; perfluoropolymethylisopropyl ether; persea gratissima; persea gratissima; petrolatum; petroleum hydrocarbon; phenyl dimethicone; phenyl methicone; phenyl trimethicone; phosphatidylcholine; pimenta acris; piscum iecur; pistacia vera; placental lipids; polyglyceryl-4 cocoate; polygonum aviculare; polyisoprene; polypentene; polyquaternium-2; polysilicone-3; polysilicone-4; polysilicone-5; PPG-1 trideceth-6; PPG-1-ceteth-1; PPG-1-ceteth-10; PPG-1-ceteth-20; PPG-1-ceteth-5; PPG-10 butanediol; PPG-10 cetyl ether phosphate; PPG-10 jojoba acid; PPG-10 jojoba alcohol; PPG-10 methyl glucose ether; PPG-10 oleyl ether; PPG-11 stearyl ether; PPG-12; PPG-12/SMDI copolymer; PPG-12 butyl ether; PPG-12-PEG-50 lanolin; PPG-12-PEG-65 lanolin oil; PPG-15; PPG-15 stearyl ether; PPG-15 stearyl ether benzoate; PPG-17; PPG-17 butyl ether; PPG-17 dioleate; PPG-2 butyl ether; PPG-2 hydrogenated tallowamine; PPG-2 isostearate; PPG-2 lanolin alcohol ether; PPG-2 myristyl ether propionate; PPG-2-buteth-2; PPG-2-ceteth-1; PPG-2-ceteth-5; PPG-20; PPG-20 butyl ether; PPG-20 lanolin alcohol ether; PPG-20 methyl glucose ether acetate; PPG-20 oleyl ether; PPG-23 oleyl ether; PPG-23-steareth-34; PPG-25 butyl ether phosphate; PPG-26; PPG-26 butyl ether; PPG-26 oleate; PPG-3 myristyl ether; PPG-3-deceth-2 carboxylic acid; PPG-3-ISODECETH-1; PPG-30; PPG-30 cetyl ether; PPG-30 isocetyl ether; PPG-30 lanolin alcohol ether; PPG-30 oleyl ether; PPG-34; PPG-36 oleate; PPG-36-buteth-36; PPG-37 oleyl ether; PPG-4 jojoba acid; PPG-4 jojoba alcohol; PPG-4 laureth-2; PPG-4 laureth-7; PPG-4 lauryl ether; PPG-4 myristyl ether; PPG-4-buteth-4; PPG-4-ceteth-20; PPG-4-deceth-4; PPG-40-PEG-60 lanolin oil; PPG-5 lanolin alcohol ether; PPG-5 lanolin wax; PPG-5 lanolin wax glyceride; PPG-5 pentaerythrityl ether; PPG-5-buteth-5; PPG-5-laureth-5; PPG-50 oleyl ether; PPG-52 butyl ether; PPG-6-deceth-4; PPG-6-deceth-9; PPG-6-laureth-3;

PPG-6-sorbeth-245; PPG-6-sorbeth-500; PPG-68-PEG-10 trimethylolpropane; PPG-7/succinic acid copolymer; PPG-7 lauryl ether; PPG-8 deceth-6; PPG-8 polyglyceryl-2 ether; PPG-9; PPG-9 diglyceryl ether; PPG-9 laurate; PPG-9-steareth-3; pristane; propylene glycol behenate; propylene glycol capreth-4; propylene glycol caprylate; propylene glycol ceteth-3 acetate; propylene glycol ceteth-3 propionate; propylene glycol citrate; propylene glycol cocoate; propylene glycol dicaprate; propylene glycol dicaproate; propylene glycol dicaprylate; propylene glycol dicaprylate/dicaprate; propylene glycol dicocoate; propylene glycol diisostearate; propylene glycol dilaurate; propylene glycol dioctanoate; propylene glycol dioleate; propylene glycol dipelargonate; propylene glycol distearate; propylene glycol hydroxystearate; propylene glycol isoceteth-3 acetate; propylene glycol isostearate; propylene glycol laurate; propylene glycol linoleate; propylene glycol linolenate; propylene glycol myristate; propylene glycol myristyl ether; propylene glycol myristyl ether acetate; propylene glycol oleate; propylene glycol oleth-5; propylene glycol ricinoleate; propylene glycol soyate; propylene glycol stearate; prunus armeniaca; prunus armeniaca; prunus avium; prunus dulcis; prunus persica; rapeseed glyceride; rapeseed glycerides; red petrolatum; rhus succedanea; ricinoleic acid; ricinus communis; rosa canina; rosa moschata; safflower glyceride; salmo; salvia hispanica; sesamum indicum; sesamum indicum; shellac; shellac cera; shorea stenoptera; silica dimethyl silylate; silica silylate; simethicone; sorbitan distearate; soy acid; sphingolipids; squalane; squalene; squali iecur; stearoxy dimethicone; stearoxymethicone/dimethicone copolymer; stearoxytrimethylsilane; stearyl/aminopropyl methicone copolymer; stearyl acetate; stearyl alcohol; stearyl behenate; stearyl benzoate; stearyl caprylate; stearyl citrate; stearyl dimethicone; stearyl erucate; stearyl glycol; stearyl glycol isostearate; stearyl heptanoate; stearyl lactate; stearyl linoleate; stearyl methicone; stearyl octanoate; stearyl stearate; stearyl stearoyl stearate; sucrose distearate; sulfurized jojoba oil; sunflower seed oil glyceride; sunflower seed oil glycerides; synthetic candelilla wax; synthetic carnauba; synthetic japan wax; synthetic jojoba oil; synthetic wax; tall oil acid; tall oil glycerides; tall oil sterol; tallol; tallow acid; tallow alcohol; tallow glyceride; tallow glycerides; taraktogenos kurzii; tetrabutoxypropyl trisiloxane; tetradecyleicosanol; tetradecyleicosyl stearate; tetradecyloctadecanol; tetramethyl tetraphenyl trisiloxane; theobroma cacao; tri-C12-13 alkyl citrate; triarachidin; tribehenin; tricaprin; tricaprylin; tricaprylyl citrate; tridecyl alcohol; tridecyl behenate; tridecyl cocoate; tridecyl erucate; tridecyl isononanoate; tridecyl myristate; tridecyl neopentanoate; tridecyl octanoate; tridecyl stearate; tridecyl stearoyl stearate; tridecyl trimellitate; trierucin; triheptylundecanoin; trihydroxymethoxystearin; trihydroxystearin; triisocetyl citrate; triisononanoin; triisopalmitin; triisopropyl trilinoleate; triisostearin; triisostearin PEG-6 esters; triisostearyl citrate; triisostearyl trilinoleate; trilaurin; trilauryl citrate; trilinoleic acid; trilinolein; trilinolenin; trimethyl pentaphenyl trisiloxane; trimethylolpropane tricaprylate/tricaprate; trimethylolpropane tricocoate; trimethylolpropane triisostearate; trimethylolpropane trilaurate; trimethylolpropane trioctanoate; trimethylolpropane tristearate; trimethylsiloxysilicate; trimethylsilylamodimethicone; trimyristin; trioctanoin; trioctyldodecyl citrate; triolein; triolein PEG-6 esters; trioleyl phosphate; tripalmitin; tripalmitolein; triphenyl trimethicone; tripropylene glycol citrate; triricinolein; tris(tributoxysiloxy)methylsilane; trisebacin; tristearin; tristearyl citrate; triticum vulgare; triticum vulgare; triundecanoin; undecylpentadecanol; vegetable glycerides phosphate; vitis vinifera; wheat germ acid; wheat germ glycerides; zea mays.

Humectants useful in the invention as moisturizing agents include: 1,2,6-hexanetriol; acetamide MEA; aluminum hydroxide; arachidyl glycol; arginine PCA; butoxypropanol; butylene glycol; butyloctanol; capryl

glycol; carboxymethyl chitosan succinamide; chitosan PCA; copper acetyl tyrosinate methylsilanol; copper PCA; copper PCA methylsilanol; cyclomethicone; diglycerin; dimethicone copolyol acetate; dimethicone copolyol adipate; dimethicone copolyol behenate; dimethicone copolyol butyl ether; dimethicone copolyol hydroxystearate; dimethicone copolyol isostearate; dimethicone copolyol laurate; dimethicone copolyol methyl ether; dimethicone copolyol phosphate; dimethicone copolyol stearate; dimethicone copolyolamine; dimethicone silylate; dimethyl imidazolidinone; dimethylsilanol hyaluronate; dipotassium glycyrrhizate; erythritol; ethoxydiglycol; fructose; glucamine; gluconic acid; glucose; glucose glutamate; glucuronic acid; glutamic acid; glutamic acid; glycereth-12; glycereth-20; glycereth-26; glycereth-7; glycerin; glycogen; glycyrrhetinyl stearate; glycyrrhizic acid; heilmoor clay; hexacosyl glycol; hexanediol beeswax; hexanetriol beeswax; hexyldecanol; histidine; histidine; hyaluronic acid; hydrogenated honey; hydrogenated starch hydrolysate; hydrolyzed collagen; hydrolyzed elastin; hydrolyzed glycosaminoglycans; hydrolyzed keratin; hydrolyzed silk; hydrolyzed soy protein; hydrolyzed wheat protein/dimethicone copolyol phosphate copolymer; hydroxyethyl sorbitol; inositol; inositol hexa-PCA; isopropyl hydroxybutyramide dimethicone copolyol; lactamide MEA; lactic acid; lactitol; lactose; lauryl PCA; lysine PCA; lysine PCA; lysine PCA; magnesium PCA; maltitol; manganese PCA; mannitol; MEL; menthyl PCA; methoxy PEG-10; methoxy PEG-100; methoxy PEG-16; methoxy PEG-40; methyl gluceth-10; methyl gluceth-20; methyl glucose dioleate; methylsilanol PCA; octyl PCA; PCA; PEG-10; PEG-10 propylene glycol; PEG-100; PEG-12; PEG-135; PEG-14; PEG-150; PEG-16; PEG-18; PEG-180; PEG-2 lactamide; PEG-20; PEG-20 stearate; PEG-200; PEG-240; PEG-25M; PEG-3 stearate; PEG-32; PEG-4; PEG-40; PEG-45M; PEG-6; PEG-60; PEG-75; PEG-8; PEG-8 stearate; PEG-9; PEG-90; placental protein; polydextrose; polyglucuronic acid; polyglycerin-3; polyglyceryl sorbitol; polysilicone-1; polysilicone-2; potassium dimethicone copolyol panthenyl phosphate; potassium dimethicone copolyol phosphate; potassium PCA; PPG-20 methyl glucose ether; PPG-20 methyl glucose ether distearate; PPG-38-buteth-37; propylene glycol; pyridoxine dilaurate; saccharide isomerate; serica; serum albumin; silk amino acids; sodium carboxymethyl chitin; sodium lactate; sodium mannuronate methylsilanol; sodium PCA; sodium PCA; sodium PCA methylsilanol; sodium PG-propyl thiosulfate dimethicone; sodium polyglutamate; soluble collagen; sorbitol; soy sterol; sucrose; sulfated castor oil; TEA-lactate; TEA-PCA; trehalose; tricontanyl PVP; trifluoromethyl C1-4 alkyl dimethicone; trilactin; urea; xylitol; zea mays; zinc PCA.

The agent can also be a depilatory agent. A depilatory agent is an agent which removes body hair. Examples of depilatory agents include: alkali sulphides; alkaline earth sulphides; ammonium thioglycolate; ammonium thiolactate; barium sulfide; calcium sulfide; calcium thioglycolate; ethanolamine thioglycolate; glyceryl thioglycolate; isooctyl thioglycolate; lithium sulfide; magnesium sulfide; magnesium thioglycolate; mercaptopropionic acid; potassium sulfide; potassium thioglycolate; sodium sulfide; sodium thioglycolate; strontium sulfide; strontium thioglycolate; thioglycerin; thioglycollic acid and its salts; thiolactic acid; and zinc sulfide.

A preferred cosmetic agent is any of the known bulking agents which can be added to the hair or nails to provide 'body' and strength. Bulking agents are well known to those of ordinary skill in the art. Examples of bulking agents generally include cationic surfactant/polymers, fatty alcohols (non-ionic surfactant), waxes or esters, non-ionic polymers (e.g. polyglycols) for thickening, and insoluble silicone. The preferred bulking agent is the cationic surfactant, which places a dispersive charge on the hair. Examples of cationic surfactants include:

quaternary ammonium hydroxides, e.g., tetramethylammonium hydroxide, alkyltrimethylammonium hydroxides wherein the alkyl group has from about 8 to 22 carbon atoms, for example octyltrimethylammonium hydroxide, dodecyltrimethy-ammonium hydroxide, hexadecyltrimethylammonium hydroxide, cetyltrimethylammonium hydroxide, octyldimethylbenzylammonium hydroxide, decyldimethyl-benzylammonium hydroxide, stearyldimethylbenzylammonium hydroxide, didodecyldimethylammonium hydroxide, dioctadecyldimethylammonium hydroxide, tallow trimethylammonium hydroxide, cocotrimethylammonium hydroxide, and the corresponding salts thereof, e.g., chlorides; cetylpyridinium hydroxide or salts thereof, e.g., chloride; Quaternium -5, Quaternium -31, Quaternium -18 and mixtures thereof. Additional bulking agents can be solutions of proteins, peptides, and polynucleotides or combinations thereof. Particular bulking agents include collagen, keratins, plant structural proteins, silk, fibrin, mucopolysaccharide and elastin. Other examples of bulking agents include: polylysine; biotin, panthenol, glycoprotein, and mucopolysaccharide; amodimethicone; acrylates; dimethicone copolymer; di-isobutyl adipate; isododecane; polypropylene glycol, glycerol, disaccharides, urea, dithiothreitol, edta, methyl paraben, propylparaben; polyvinylpyrrolidone and copolymers or derivatives thereof; for example, copolymers with the ethyl or butyl ester of PVA/MA (partially neutralized), copolymers with vinyl acetate/crotonic acid, copolymers of PVP/VA in all proportions, Polyquaternium-11, and copolymers with ethyl methacrylate/oleyl methacrylate/diethylaminoethyl methacrylate quaternized with dimethyl sulfate, as well as carboxyvinyl polymers, such as hydroxyethyl cellulose, hydroxypropyl methylcellulose, and guar gum, zanthan gum, tragacanth gum, and other natural viscosity boosters; ceramide; copolymers of vinyl acetate and crotonic acid, terpolymers of vinyl acetate, crotonic acid and a vinyl ester of an alpha-branched saturated aliphatic monocarboxylic acid such as vinyl neodecanoate, and copolymers of methyl vinyl ether and maleic anhydride (molar ratio about 1:1) wherein such copolymers are 50% esterified with a saturated aliphatic alcohol containing from 1 to 4 carbon atoms such as ethanol or butanol; and acrylic copolymers and terpolymers containing acrylic acid or methacrylic acid as the anionic radical containing moiety such as terpolymers of methacrylic acid, butylacrylate and ethyl methacrylate which is presently the preferred acrylic polymer.

Bulking agents can be used as hair conditioning or hair fixative agents. Hair conditioning agents are agents which improve the appearance, texture and sheen of hair as well as increasing hair body or suppleness. Usually these compounds facilitate hair styling. Examples of hair conditioning agents include: Acetamide MEA; Acetamidoethoxybutyl Trimonium Chloride; Acetylated Lanolin; Acetylated Lanolin Alcohol; Acetylmethionyl Methylsilanol Elastinate; Acrylates/Carbamate Copolymer; Alanine; Albumen; Alfalfa (Medicago Sativa) Oil Unsaponifiables; Almondamidopropalkonium Chloride; Almondamidopropyl Betaine; Aluminum Capryloyl Hydrolyzed Collagen; Aluminum Undecylenoyl Collagen Amino Acids; Amino Bispropyl Dimethicone; Aminopropyl Dimethicone; Aminopropyl Laurylglutamine; Ammonium Caseinate; Ammonium Hydrolyzed Collagen; Ammonium Lauroyl Sarcosinate; Amodimethicone; Amodimethicone/Dimethicone Copolyol; Amodimethicone Hydroxystearate; AMP-Isostearoyl Gelatin/Keratin Amino Acids/Lysine Hydroxypropyltrimonium Chloride; AMP-Isostearoyl Hydrolyzed Collagen; AMP-Isostearoyl Hydrolyzed Soy Protein; AMP-Isostearoyl Hydrolyzed Wheat Protein; AMPD-Isostearcyl Hydrolyzed Collagen; AMPD-Rosin Hydrolyzed Collagen; Apricotamidopropyl Betaine; Apricotamidopropyl Ethyldimonium Ethosulfate; Argemone Mexicana Oil; Arginine; Arginine Aspartate; Asparagine; Aspartic Acid; Atelocollagen;

Avocadamidopropyl Betaine; Avocado (Persea Gratissima) Oil Unsaponifiables; Babassuamide DEA; Babassuamidopropalkonium Chloride; Babassuamidopropylamine Oxide; Babassuamidopropyl Betaine; Beer; Behenamide DEA; Behenamide MEA; Behenamidopropyl Betaine; Behenamidopropyl Dimethylamine Behenate; Behenamidopropyl Dimethylamine Lactate; Behenamidopropyl Ethyldimonium Ethosulfate; Behenamidopropyl PG-Dimonium Chloride; Behenoyl PG-Trimonium Chloride; Behentrimonium Chloride; Behentrimonium Methosulfate; Behenyl Betaine; Behenyl Hydroxyethyl Imidazoline; Benzyltrimonium Hydrolyzed Collagen; Biotin; Bisphenylhexamethicone; Butoxy Chitosan; Buttermilk Powder; Butyloctyl Salicylate; Calcium Caseinate; Calcium Pantothenate; Canolamidopropyl Betaine; Canolamidopropyl Ethyldimonium Ethosulfate; Caproyl Sphingosine; Capryl/Capramidopropyl Betaine; Capryl Hydroxyethyl Imidazoline; Capryloyl Collagen Amino Acids; Capryloyl Glycine; Capryloyl Hydrolyzed Collagen; Capryloyl Hydrolyzed Keratin; Capryloyl Keratin Amino Acids; Capryloyl Pea Amino Acids; Capryloyl Quinoa Amino Acids; Capryloyl Silk Amino Acids; Caprylyl Glycol; Caprylyl Hydroxyethyl Imidazoline; Caprylyl Pyrrolidone; Carboxybutyl Chitosan; Carboxymethyl Chitin; Carboxymethyl Chitosan Succinamide; Carboxymethyl Isostearamidopropyl Morpholine; Carnitine; Carpronium Chloride; Casein; Catalase; Cauliflower (Brassica Oleracea Botrytis) Oil Unsaponifiables; Ceramide 1; Ceramide 2; Ceramide 3; Ceramide 4; Ceramide 5; Ceramide 1 A; Ceramide 6 II; Ceteartrimonium Chloride; Cetearyl Dimethicone/Vinyl Dimethicone Crosspolymer; Cetearyl Isononanoate; Cetearyl Octanoate; Cetearyl Palmitate; Cetyl Betaine; Cetyl Glycol; Cetyl Pyrrolidonylmethyl Dimonium Chloride; Cetyl Triethylammonium Dimethicone Copolyol Phthalate; Cholecalciferol Polypeptide; Cocamidoethyl Betaine; Cocamidopropylamine Oxide; Cocamidopropyl Amine Oxide; Cocamidopropyl Betaine; Cocamidopropyl Dimethylamine Dihydroxymethylpropionate; Cocamidopropyl Dimethylamine Hydrolyzed Collagen; Cocamidopropyl Dimethylamine Lactate; Cocamidopropyl Dimethylamine Propionate; Cocamidopropyl Dimethylamino-hydroxypropyl Hydrolyzed Collagen; Cocamidopropyl Dimethylammonium C8-16 Isoalkylsuccinyl Lactoglobulin Sulfonate; Cocamidopropyldimonium Hydroxypropyl Hydrolyzed Collagen; Cocamidopropyl Ethyldimonium Ethosulfate; Cocamidopropyl Hydroxysultaine; Cocamidopropyl Morpholine; Cocamidopropyl Morpholine Lactate; Cocamidopropyl PG-Dimonium Chloride; Cocamidopropyl PG-Dimonium Chloride Phosphate; Cocamidopropyltrimonium Chloride; Cocamine Oxide; Cocaminobutyric Acid; Cocaminopropionic Acid; Cocoalkonium Chloride; Cocoamphodipropionic Acid; Cocobetainamido Amphopropionate; Coco-Betaine; Cocodimonium Hydroxypropyl Hydrolyzed Casein; Cocodimonium Hydroxypropyl Hydrolyzed Collagen; Cocodimonium Hydroxypropyl Hydrolyzed Hair Keratin; Cocodimonium Hydroxypropyl Hydrolyzed Keratin; Cocodimonium Hydroxypropyl Hydrolyzed Rice Protein; Cocodimonium Hydroxypropyl Hydrolyzed Silk; Cocodimonium Hydroxypropyl Hydrolyzed Soy Protein; Cocodimonium Hydroxypropyl Hydrolyzed Wheat Protein; Cocodimonium Hydroxypropyl Silk Amino Acids; Coco-Ethyldimonium Ethosulfate; Coco-Hydroxysultaine; Coco-Morpholine Oxide; Coconut (Cocos Nucifera) Oil; Coco/Oleamidopropyl Betaine; Coco-Sultaine; Cocotrimonium Chloride; Cocotrimonium Methosulfate; Cocoyl Benzyl Hydroxyethyl Imidazolinium Chloride; Cocoyl Glutamic Acid; Cocoyl Hydrolyzed Collage; Cocoyl Hydrolyzed Keratin; Cocoyl Hydrolyzed Soy Protein; Cocoyl Hydroxyethyl Imidazoline; Cocoyl Hydroxyethylimidazolinium PG-Chloride phosphate; cocoyl sarcosinamide DEA; Cocyl sarcosine; Collagen; Collagen Amino Acids; Corn (Zea Mays) Gluten Protein; Corn (Zea Mays) Oil; Corn (Zea Mays) Oil Unsaponifiables; Crystallins;

Cylcomethicone; Cysteine; Cysteine HCl; Cystine; DATEM; DEA-Cocoamphodipropionate; DEA-Cyclocarboxypropyloleate; DEA-Hydrolyzed Lecithin; DEA-Lauraminopropionate; Decyl Betaine; Decyl Mercaptomethylimidazole; Desamido Collagen; Dextran Hydroxy-propyltrimonium Chloride; Diaminopyrimidine Oxide; Dibehenamidopropyldimethylamine Dilinoleate; DibehenylDjarachidyl Dimonium Chloride; Dibehenyldimonium Chloride; Dibehenyldimonium Methosulfate; Dibutyl Lauroyl Glutamide; Di-C12-15 Alkyl Dimonium Chloride; Di-C12-18 Alkyl Dimonium Chloride; Di-C14-18 Alkyl Dimonium Chloride; Dicapryl/Dicaprylyl Dimonium Chloride; Dicapryloyl Cystine; Dicetyldiminium Chloride; Dicocodimethylamine Dilinoleate; Dicocodimonium Chloride; Dicocoylethyl Hydroxyethylmonium Methosolufate; Didecyldimonium Chloride; Diethylaminoethyl Cocoate; Diethylaminoethyl PEG-5 Cocoate; Diethylaminoethyl PEG-5 Laurate; Diethylaminoethyl Stearate; Diethylene Glycol Dibenzoate; Diethylene Glycol Diisononanoate; Diethylene Glycol Dioctanoate; Diethylene Glycol Dioctanoate/ Diisononanoate; Diethylene Tricaseinamide; Dihyrogenated Palmoylethyl Hydroxy-ethylmonium Methosulfate; Dihydrogenated Palmoyl Hydroxyethylmonium Methosulfate; Dihydrogenated Tallowamidoethyl Hydroxyethylmonium Chloride; Dihydrogenated Tallowamidoethyl Hydroxyethylmonium Methosulfate; Dihydrogenated Tallow Benzylmonium Chloride; Dihyrodgenated Tallowethyl Hydroxyethylmonium Methosulate; Dihydrogenated Tallow Hydroxyethylmonium Methosulfate; Dihydrogenated Tallowoylethyl Hydroxyethylmonium Methosulfate; Dihydroxyethylamino Hydroxypropyl Oleate; Dihydroxyethyl C12-15 Alkoxypropylamine Oxide; Dihidroxyethyl Cocamine Oxide; Dihyroxyethyl Oleyl Glycinate; Dihydroxyethyl Soy Glycinate; Dihydroxyethyl Stearamine Oxide; Dihydroxyethyl Stearyl Glycinate; Dihydroxyethyl Tallowamine/IPDI Copolymer; Dihydroxyethyl Tallowamine Oleate; dihydroxyethyl Tallowamine Oxide; dihydroxyethyl Tallow Glycinate; Dihydroxypropyl PEG-5 Linoleammonium Chloride Phosphate; Diisostearamidopropyl Epoxypropylmonium Chloride; Dilaureth-4 Dimonium Chloride; Dilauryl Acetyl Dimonium Chloride; Dilauryldimonium Chloride; Dilinoleamidopropyl Dimethylamine Dimethicone Copolyol Phosphate; Dimenthicone Bisamino Hydroxypropyl Copolyol; Dimenthicone Copolyol; Dimethicone Copolyol Acetate; Dimethicone Copolyol Adipate; Dimethicone Copolyol Almondate; Dimethicone Copolyol Avocadoate; Dimethicone Copolyol Beeswax; Dimethicone Copolyol Bishydroxyethylamine; Dimethiocone Copolyol Borageate; Dimethicone Copolyol Butyl Ether; Dimethicone Copolyol Cocoa Butterate; Dimethicone Copolyol Dhupa Butterate; Dimethicone Copolyol Ethyl Ether; Dimethicone Copolyol Kokum Butterate; Dimethicone Copolyol Lactate; Dimethicone Copolyol Mango Butterate; Dimethicone Copolyol Methyl Ether; Dimethicone Copolyol Mohwa Butterate; Dimethicone Copolyol Olivate; Dimethicone Copolyol Phthalate; Dimethicone Copolyol Sal Butterate; Dimethicone Copolyol Shea Butterate; Dimethicone Copolyol Undecylenate; Dimethicone Hydroxyptropyl Trimonioum Chloride; Dimethicone/Mercaptopropyl Methicone Copolymer; Dimethicone Propyl PG-Betaine; Dimethicone/Sodium PG-Propyidimethicone Thiosulfate Copolymer; Dimethiconol Arginine; Dimethiconol Cysteine; Dimethiconol Lactate; Dimethiconol Panthenol; Dimethiconol/ Silsesquioxane Copolymer; Dimethaxysilyl Ethylenediaminopropyl Dimethicone; Dimethylaminopropylamido PCA Dimethicone; Dimethyl Aspartic Acid; Dimethyl Glutamic Acid; Dimethyl Lauramine Dimer Dilinoleate; Dimethyl Lauramine Isostearate; Dimethyl Lauramine Oleate; DimethylPABAmidopropyl Laurdimonium Tosylate; Dioctyldodeceth-2 Lauroyl Glutamate; Dioctyldodecyl Dodecanedioate; Dioctyldodecyl Lauroyl Glutamate; Dioleoyl EDTHP-Monium Methosulfate; Dioleoylethyl Hydroxyethylmonium Methosulfate;

Dioleoylisopropyl Dimonium Methosulfate; Dipalmitoyl Cystine; Dipalmitoylethyl Dimonium Chloride; Dipalmitoylethyl Hydroxyethylmonium Methosulfate; Dipalmoylethyl Hydroxyethylmonium Methosulfate; Disodium Caproamphodiacetate; Disodium Caproamphodipropionate; Disodium Capryloamphodiacetate; Disodium Capryloamphodipropionate; Disodium Cocaminopropyl Iminodiacetate; Disodium Cocoamphocarboxyethylhydroxypropyisulfonate; Disodium Cocoamphodiacetate; Disodium Cocoamphodipropionate; Disodium Cystinyl Disuccinate; Disodium Dicarboxyethyl Cocopropylenediamine: Disodium Hydrogenated Tallow Glutamate; Disodium Isostearoamphodiacetate; Disodium Isostearoamphodipropionate; Disodium Laureth-5 Carboxyamphodiacetate; Disodium Lauriminodipropionate; Disodium Lauroamphodiacetate; Disodium Lauroamphodipropionate; Disodium Oleoamphodipropionate; Disodium PPG-2-Isodeceth-7 Carboxyamphodiacetate; Disodium Steariminodipropionate; Disodium Stearoamphodiacetate; Disodium Stearoyl Glutamate; Disodium Tallowamphodiacetate; Disodium Tallowiminodipropionate; Disodium Wheatgermamphodiacetate; Disoyamidoethyl Hydroxyethyl Ammonium Lactate; Disoydimonium Chloride; Disoyoylethyl Hydroxyethylmonium Methosulfate; Distearet-6 Dimonium Chloride; Distearet-2 Lauroyl Glutamate; Distearet-5 Lauroyl Glutamate; Distearoylethyl Dimonium Chloride; Distearoylethyl Hydroxyethyimonium Methosulfate; Distearoylpropyl Trimonium Chloride; Distearyldimethylamine Dilinoleate; Distearyldimonium Chloride; Distearyl Epoxypropylmonium Chloride; Ditallowamidoethyl Hydroxypropylamine; Ditallowamidoethyl Hydroxypropylmonium Methosulfate; Ditallow Dimonium Cellulose Sulfate; Ditallowdimonium Chloride; Ditallowethyl Hydroxyethylmonium Methosulfate; Ditallowoylethyl Hydroxyethylmonium Methosulfate; Ditridecyldimonium Chloride; Dodecylbenzyltrimonium Chloride; Dodecylhexadecyltrimonium Chloride; Dodecylxylylditrimonium Chloride; Egg; Egg Oil; Egg Powder; Elastin; Elastin Amino Acids; Erucalkonium Chloride; Erucamidopropyl Hydroxysultaine; Ethyl Almondate; Ethyl Apricot Kernelate; Ethyl Biotinate; Ethyl Ester of Hydrolyzed Animal Protein; Ethyl Ester of Hydrolyzed Keratin; Ethyl Ester of Hydrolyzed Silk; Ethyl Glutamate; Ethyl Hydroxymethyl Oleyl Oxazoline; Ethyl Minkate; Ethyl Morrhuate; Ethyl Myristate; Ethyl Oleate; Ethyl Olivate; Ethyl Palmitate; Ethyl Pelargonate; Ethyl Persate; Ethyl Serinate; Ethyl Stearate; Ethyl Wheat Germate; Fibronectin; Gelatin; Gelatin/Keratin Amino Acids/Lysine Hydroxypropyltrimonium Chloride; Gelatin/Lysine/Polyacrylamide Hydroxypropyltrimonium Chloride; Ginseng Hydroxypropyltrimonium Chloride; Glucaric Acid; Glucose Oxidase; Glutamic Acid; Glutamine; Glutamyl Histamine; Glyceryl Collagenate; Glyceryl Lanolate; Glycine; Glycoproteins; Glycyl Glycine; Guar Hydroxpropyltrimonium Chloride; Hair Keratin Amino Acids; Hexyldecyl Ester of Hydrolyzed Collagen; Hexyldodecyl Salicylate; Hinokitiol; Histidine; Histidine HCl; Human Placental Enzymes; Human Placental Lipids; Human Placental Protein; Hydrogenated Lanolin; Hydrogenated Olive Oil Unsaponifiables; Hydrogenated Palmtrimonium Chloride; Hydrogenated Tallowalkonium Chloride; Hydrogenated Tallow Betaine; Hydrogenated Tallowoyl Glutamic Acid; Hydrogenated Tallowtrimonium Chloride; Hydrolyzed Actin; Hydrolyzed Casein; Hydrolyzed Collagen; Hydrolyzed Conchiorin Protein; Hydrolyzed Corn Protein; Hydrolyzed DNA; Hydrolyzed Egg Protein; Hydrolyzed Elastin; Hydrolyzed Extensin; Hydrolyzed Fibronectin; Hydrolyzed Glycosaminoglycans; Hydrolyzed Hair Keratin; Hydrolyzed Hemoglobin; Hydrolyzed Human Placental Protein; Hydrolyzed Keratin; Hydrolyzed Lupine Protein; Hydrolyzed Maple Sycamore Protein; Hydrolyzed Milk Protein; Hydrolyzed Oat Flour; Hydrolyzed Oat Protein; Hydrolyzed Oats; Hydrolyzed Pea Protein; Hydrolyzed Placental Protein; Hydrolyzed Potato Protein;

Hydrolyzed Reticulin; Hydrolyzed Rice Bran Protein; Hydrolyzed Rice Protein; Hydrolyzed RNA; Hydrolyzed Serum Protein; Hydrolyzed Silk; Hydrolyzed Soy Protein; Hydrolyzed Soy Protein/Dimethicone Copolyol Acetate; Hydrolyzed Spinal Protein; Hydrolyzed Sweet Almond Protein; Hydrolyzed Vegetable Protein; Hydrolyzed Wheat Gluten; Hydrolyzed Wheat Protein; Hydrolyzed Wheat Protein/Dimethicone Copolyol Acetate; Hydrolyzed Wheat Protein Hydroxypropyl Polysiloxane; Hydrolyzed Wheat Protein/PEG-20 Acetate Copolymer; Hydrolyzed Yeast; Hydrolyzed Yeast Protein; Hydrolyzed Zein; Hydroxycaproyl Phytosphingosine; Hydroxycapryloyl Phytosphingosine; Hydroxycetyl Hydroxyethyl Dimonium Chloride; Hydroxyethyl Behenamidopropyl Dimonium Chloride; Hydroxyethyl Carboxymethyl; Cocamidopropylamine; Hydroxyethyl Cetyldimonium Chloride; Hydroxyethyl Cetyldimonium Phosphate; Hydroxyethyl Diphenyl Imidazoline; Hydroxyethyl Hydroxypropyl C12-15 Alkoxypropylamine Oxide; Hydroxyethyl Laurdimonium Chloride; Hydroxyethyl Tallowdimonium Chloride; Hydroxylauroyl Phytosphingosine; Hydroxyphenyl Glycinamide; Hydroxyproline; Hydroxypropyl Biscetearyldimonium Chloride; Hydroxypropyl Bisisostearamidopropyldimonium Chloride; Hydroxypropyl Bisoleyldimonium Chloride; Hydroxypropyl Bisstearyidimonium Chloride; Hydroxypropyldimethicone; Hydroxypropyl Guar Hydroxypropyltrimonium Chloride; Hydroxypropyltrimonium Gelatin; Hydroxypropyitrimonium Honey; Hydroxypropyltrimonium Hydrolyzed Casein; Hydroxypropyltrimonium Hydrolyzed Collagen; Hydroxypropyltrimonium Hydrolyzed Keratin; Hydroxypropyltrimonium Hydrolyzed Rice Bran Protein; Hydroxypropyltrimonium Hydrolyzed Silk; Hydroxypropyltrimonium Hydrolyzed Soy Protein; Hydroxypropyltrimonium Hydrolyzed Vegetable Protein; Hydroxypropyltrimonium Hydrolyzed Wheat Protein; Hydroxystearamidopropyl Trimonium Chloride; Hydroxystearamidopropyl Trimonium Methosulfate;Inositol; Iodized Corn Protein; Isobutylated Lanolin Oil; Isoleucine; Isostearamidopropylamine Oxide; Isostearamidopropyl Betaine; Isostearamidopropyl Epoxypropylmorpholinium Chloride; Isostearamidopropyl Ethyldimonium Ethosulfate; Isostearamidopropyl Ethylmorpholinium Ethosulfate; Isostearamidopropyl Laurylacetodimonium Chloride; Isostearamidopropyl Morpholine Oxide; Isostearamidopropyl PG-Dimonium Chloride; Isostearaminopropalkonium Chloride; Isostearoyl Hydrolyzed Collagen; Isostearoyl PG-Trimonium Chloride; Isostearyl Benzylimidonium Chloride; Isostearyl Ethyldimonium Chloride; Isostearyl Ethylimidazolinium Ethosulfate; Isostearyl Glyceryl Pentaerythrityl Ether; Isostearyl Hydroxyethyl Imidazoline; Isostearyl Laurdimonium Chloride; Isotridecyl Laurate; Isotridecyl Myristate; Jojoba Butter; Jojoba (Buxus Chinensis) Oil; Jojoba Wax; Juniperus Oxycedrus Tar; Keratin; Keratin Amino Acids; Lactamide MEA; Lactoferrin; Lactoglobulin; Lactoyl Methylsilanol Elastinate; Lactoyl Phytosphingosine; Laneth-9 Acetate; Laneth-10 Acetate; Lanolin; Lanolin Alcohol; Lanolin Linoleate; Lanolin Oil; Lanolin Ricinoleate; Lanolin Wax; Lanosterol; Lauramidopropyl-amine Oxide; Lauramidopropyl Betaine; Lauramidopropyl PG-Dimonium Chloride; Lauramine Oxide; Lauraminopropionic Acid; Laurdimonium Hydroxypropyl Hydrolyzed Soy Protein; Laurdimonium Hydroxypropyl Hydrolyzed Wheat Protein; Lauroamphodipropionic Acid; Lauroyl Collagen Amino Acids; Lauroyl Hydrolyzed Collagen; Lauroyl Hydrolyzed Elastin; Lauroyl Lysine; Lauroyl PG-Trimonium Chloride; Lauroyl Sarcosine; Lauroyl Silk Amino Acids; Laurtrimonium Bromide; Laurylamine Dipropylenediamine; Lauryl Aminopropylglycine; Lauryl Betaine; Lauryl Diethylenediaminoglycine; Lauryl Dimethylamine Cyclocarboxypropyloleate; Lauryldimonium Hydroxypropyl Hydrolyzed Casein; Lauryldimonium Hydroxypropyl Hydrolyzed Collagen; Lauryldimonium Hydroxypropyl Hydrolyzed Keratin; Lauryldimonium Hydroxypropyl Hydrolyzed Silk; Lauryldimonium

Hydroxypropyl Hydrolyzed Soy Protein; Lauryl Glycol; Lauryl Hydroxyethyl Imidazoline; Lauryl Hydroxysultaine; Lauryl Methyl Gluceth-10 Hydroxypropyldimonium Chloride; Lauryl Myristate; Lauryl Pyrrolidone; Lauryl Sultaine; Lecithinamide DEA; Leucine; Linoleamide; Linoleamide DEA; Linoleamide MEA; Linoleamide MIPA; Linoleamidopropalkonium Chloride; Linoleamidopropyl Dimethylamine Dimer Dilinoleate; Linoleamidopropyl Ethyldimonium Ethosulfate; Linoleamidopropyl PG-Dimonium Chloride Phosphate Dimethicone; Linoleic Acid; Linolenic Acid; Lupin (Lupinus Albus) Oil Unsaponiflables; Lysine; Lysine Aspartate; Maltodextrin; Marmot Oil; MEA-Hydrolyzed Collagen; MEA-Hydrolyzed Silk; Methionine; Methyl Aspartic Acid; Methyl Glutamic Acid; Methyl Hydroxycetyl Glucaminium Lactate; Methyl Hydroxymethyl Oleyl Oxazoline; Methylsilanol Acetylmethionate; Methylsilanol Elastinate; Milkamidopropyl Amine Oxide; Milkamidopropyl Betaine; Milk Amino Acids; Milk Protein; Mineral Oil; Minkamidopropalkonium Chloride; Minkamidopropylamine Oxide; Minkamidopropyl Betaine; Minkamidopropyl Ethyldimonium Ethosulfate; Mink Oil; Mink Wax; Mixed Isopropanolamines Lanolate; Myristamidopropylamine Oxide; Myristamidopropyl Betaine; Myristamine Oxide; Myristaminopropionic Acid; Myristoyl Glutamic Acid; Myristoyl Hydrolyzed Collagen; Myristoyl Sarcosine; Myristyl Betaine; Myristyl/Cetyl Amine Oxide; Myristyl Hydroxyethyl Imidazoline; Niacin; Niacinamide; Nonfat Dry Colostrum; Nonfat Dry Milk; Norvaline; Oat (Avena Sativa) Protein; Octyldodecyl Lanolate; Octyldodecyltrimonium Chloride; Olealkonium Chloride; Oleamidopropylamine Oxide; Oleamidopropyl Betaine; Oleamidopropyl Dimethylamine Glycolate; Oleamidopropyl Dimethylamine Hydrolyzed Collagen; Oleamidopropyl Dimethylamine Lactate; Oleamidopropyl Dimethylamine Propionate; Oleamidopropyldimonium Hydroxypropyl Hydrolyzed Collagen; Oleamidopropyl Hydroxysultaine; Oleamidopropyl PG-Dimonium Chloride; Oleamine Bishydroxypropyltrimonium Chloride; Oleamine Oxide; Oleoyl Hydrolyzed Collagen; Oleoyl PG-Trimonium Chloride; Oleoyl Sarcosine; Oleyl Betaine; Oleyl Epoxypropyldimonium Chloride; Oleyl Hydroxyethyl Imidazoline; Oleyl Lanolate; Oleyl Linoleate; Oleyl Myristate; Oleyl Oleate; Oleyl Stearate; Olivamidopropylamine Oxide; Olivamidopropyl Betaine; Olivamidopropyl Dimethyiamine Lactate; Olive (Olea Europaea) Oil Unsaponifiables; Ostrich Oil; Oxidized Keratin; Palmamidopropyl Betaine; Palmitamidopropylamine Oxide; Palmitamidopropyl Betaine; Palmitamine Oxide; Palmitoyl Collagen Amino Acids; Palmitoyl Glycine; Palmitoyl Hydrolyzed Collagen; Palmitoyl Hydrolyzed Milk Protein; Palmitoyl Hydrolyzed Wheat Protein; Palmitoyl Keratin Amino Acids; Palmitoyl Pea Amino Acids; Palmitoyl PG-Trimonium Chloride; Palmitoyl Quinoa Amino Acids; Palmitoyl Silk Amino Acids; Palm Kernelamidopropyl Betaine; Pancreatin; Pantethine; Panthenol; Panthenyl Ethyl Ether; Panthenyl Ethyl Ether Acetate; Panthenyl Hydroxypropyl Steardimonium Chloride; Panthenyl Triacetate; Pantothenic Acid; Pantothenic Acid Polypeptide; Papain; PCA Dimethicone; PCA Ethyl Cocoyl Arginate; PEG-105 Behenyl Propylenediamine; PEG-2 Dimeadowfoamamidoethylmonium Methosulfate; PEG-3 Dioleoylamidoethylmonium Methosulfate; PEG-5 Ditridecylmonium Chloride; PEG-5 Hydrogenated Lanolin; PEG-10 Hydrogenated Lanolin; PEG-20 Hydrogenated Lanolin; PEG-24 Hydrogenated Lanolin; PEG-30 Hydrogenated Lanolin; PEG-70 Hydrogenated Lanolin; PEG-5 Lanolinamide; PEG-3 Lauramine Oxide; PEG-2 Milk Solids; PEG-5 Oleamide Dioleate; PEG-2 Oleammonium Chloride; PEG-8/SMDI Copolymer; PEG-15 Stearmonium Chloride; PEG-20 Tallow Ammonium Ethosulfate; PEG-15 Tallow Polyamine; PEG-3 Tallow Propylenedimonium Dimethosulfate; Pepsin; Petrolatum; PG-Hydroxyethylcellulose Cocodimonium Chloride; PG-Hydroxyethylcellulose

Lauryldimonium Chloride; PG-Hydroxyethylcellulose Stearyldimonium Chloride; Phenylalanine; Phenyl Trimethicone; Phytosphingosine; Phytosteryl Macadamiate; Placental Enzymes; Placental Lipids; Placental Protein; Polybeta-Alanine; Polyglyceryl-2 Oleyl Ether; Polyglyceryl-4 Oleyl Ether; Polylysine; Polymethacrylamidopropyltrimonium Chloride; Polymethacrylamidopropyltrimonium Methosulfate; Potymethylglutamate; Polyquaternium-43; Polyquaternium-44; Polysilicone-1; Polysilicone-2; Polysilicone-3; Polysilicone-4; Polysilicone-5; Polysilicone-6; Polysilicone-7; Polysilicone-8; Polysilicone-10; Potassium Abietoyl Hydrolyzed Collagen; Potassium Caseinate; Potassium Cocoyl Glutamate; Potassium Cocoyl Glycinate; Potassium Coccyl Hydrolyzed Casein; Potassium Cocoyl Hydrolyzed Collagen; Potassium Cocoyl Hydrolyzed Corn Protein; Potassium Cocoyl Hydrolyzed Keratin; Potassium Cocoyl Hydrolyzed Potato Protein; Potassium Cocoyl Hydrolyzed Rice Bran Protein; Potassium Cocoyl Hydrolyzed Rice Protein; Potassium Cocoyl Hydrolyzed Silk; Potassium Cocoyl Hydrolyzed Soy Protein; Potassium Cocoyl Hydrolyzed Wheat Protein; Potassium Dihydroxyethyl Cocamine Oxide Phosphate; Potassium Dimethicone Copolyol Panthenyl Phosphate; Potassium Lauroyl Collagen Amino Acids; Potassium Lauroyl Glutamate; Potassium Lauroyl Hydrolyzed Collagen; Potassium Lauroyl Hydrolyzed Soy Protein; Potassium Lauroyl Wheat Amino Acids; Potassium Myristoyl Glutamate; Potassium Myristoyl Hydrolyzed Collagen; Potassium Oleoyl Hydrolyzed Collagen; Potassium Palmitoyl Hydrolyzed Wheat Protein; Potassium Stearoyl Hydrolyzed Collagen; Potassium Undecylenoyl Alginate; Potassium Undecylenoyl Carrageenan; Potassium Undecylenoyl Hydrolyzed Collagen; Potassium Undecylenoyl Hydrolyzed Corn Protein; Potassium Undecylenoyl Hydrolyzed Soy Protein; Potassium Undecylenoyl Hydrolyzed Wheat Protein; PPG-2-Buteth-2; PPG-2-Buteth-3; PPG-3-Buteth-5; PPG-4-Buteth-4; PPG-5-Buteth-5; PPG-5-Buteth-7; PPG-7-Buteth-10; PPG-9-Buteth-12; PPG-10-Buteth-9; PPG-12-Buteth-12; PPG-12-Buteth-16; PPG-15-Buteth-20; PPG-17-Buteth-17; PPG-20-Buteth-30; PPG-24-Buteth-27; PPG-26-Buteth-26; PPG-28-Buteth-35; PPG-30-Buteth-30; PPG-33-Buteth-45; PPG-36-Buteth-36; PPG-38-Buteth-37; PPG-2 Butyl Ether; PPG-4 Butyl Ether; PPG-5 Butyl Ether; PPG-9 Butyl Ether; PPG-12 Butyl Ether; PPG-14 Butyl Ether; PPC-15 Butyl Ether; PPG-16 Butyl Ether; PPG-17 Butyl Ether; PPG-18 Butyl Ether; PPG-20 Butyl Ether; PPG-22 Butyl Ether; PPG-24 Butyl Ether; PPG-26 Butyl Ether; PPG-30 Butyl Ether; PPG-33 Butyl Ether; PPG-40 Butyl Ether; PPG-52 Butyl Ether; PPG-53 Butyl Ether; PPG-9 Diethylmonium Chloride; PPG-2 Lanolin Alcohol Ether; PPG-5 Lanolin Alcohol Ether; PPG-l 0 Lanolin Alcohol Ether; PPG-20 Lanolin Alcohol Ether; PPG-30 Lanolin Alcohol Ether; PPG-10 Methyl Glucose Ether; PPG-20 Methyl Glucose Ether; PPG-20-PEG-20 Hydrogenated Lanolin; PPG-12-PEG-50 Lanolin; PPG-12-PEG-65 Lanolin Oil; PPG-40-PEG-60 Lanolin Oil; PPG-12 /SMDI Copolymer; PPG-51/SMDI Copolymer; PPG-7/Succinic Acid Copolymer; Procollagen; Proline; Propyltrimonium Hydrolyzed Collagen; Propyltrimonium Hydrolyzed Soy Protein; Propyltrimonium Hydrolyzed Wheat Protein; Pyridoxine; Pyridoxine Dicaprylate; Pyridoxine Dilaurate; Pyridoxine Dioctenoate; Pyridoxine Dipalmitate; Pyridoxine HCl; Pyridoxine Tripalmitate; Quaternium-8; Quaternium-14; Quaternium-16; Quaternium-22; Quaternium-26; Quaternium-27; Quaternium-33; Quaternium-52; Quaternium-53; Quaternium-56; Quaternium-60; Quaternium-61; Quaternium-63; Quaternium-70; Quaternium-72; Quaternium-75; Quaternium-76 Hydrolyzed Collagen; Quaternium-77; Quaternium-78; Quaternium-79 Hydrolyzed Collagen; Quaternium-79 Hydrolyzed Keratin; Quaternium-79 Hydrolyzed Milk Protein; Quaternium-79 Hydrolyzed Silk; Quaternium-79 Hydrolyzed Soy Protein; Quaternium-79 Hydrolyzed Wheat Protein; Quaternium-80; Quaternium-81; Quaternium-82; Quaternium-83; Quaternium-85; Quaternium-

86; Quinine; Rapeseed (Brassica; Campestris) Oil Unsaponifiables; Resorcinol Acetate; Ricinoleamidopropyl Betaine; Ricinoleamidopropyltrimonium Chloride; Ricinoleamidopropyltrimonium Methosulfate; Rosin Hydrolyzed Collagen; Rutin; Saffloweramidopropyl Ethyldimonium Ethosulfate; Salicylic Acid; Selenium Sulfide; Sericin; Serine; Serum Albumin; Serum Protein; Sesame (Sesamum Indicum) Oil Unsaponifiables; Sesamidopropylamine Oxide; Sesamidopropyl Betaine; Shea Butter (Butyrospermum Parkii) Unsaponifiables; Shellac Wax; Silicone Quaternium-1; Silicone Quaternium-2; Silicone Quaternium-3; Silicone Quaternium-4; Silicone Quaternium-5; Silicone Quaternium-6; Silicone Quaternium-7; Silicone Quaternium-8; Silicone Quaternium-9; Silicone Quaternium-10; Silicone Quaternium-11; Silicone Quaternium-12; Silicone Quaternium-13; Silk Amino Acids; Sodium C12-15 Alkoxypropyl Iminodipropionate; Sodium Caproamphoacetate; Sodium Caproamphohydroxypropylsulfonate; Sodium Caproamphopropionate; Sodium Capryloamphoacetate; Sodium Capryloamphohydroxypropylsulfonate; Sodium Capryloamphopropionate; Sodium Caseinate; Sodium Chondroitin Sulfate; Sodium C8-16 Isoalkylsuccinyl Lactoglobulin Suffonate; Sodium Cocaminopropionate; Sodium Cocoamphoacetate; Sodium Cocoamphohydroxypropylsulfonate; Sodium Cocoamphopropionate; Sodium Cocoyl Collagen Amino Acids; Sodium Cocoyl Hydrolyzed Collagen; Sodium Cocoyl Hydrolyzed Keratin; Sodium Cocoyl Hydrolyzed Rice Protein; Sodium Cocoyl Hydrolyzed Soy Protein; Sodium Cocoyl Hydrolyzed Wheat Protein; Sodium Cocoyl Sarcosinate; Sodium Cornamphopropionate; Sodium Dicarboxyethylcoco Phosphoethyl Imidazoline; Sodium Diethylaminopropyl Cocoaspartamide; Sodium Dimethicone Copolyol Acetyl Methyltaurate; Sodium Glutamate; Sodium Hydrolyzed Casein; Sodium Hydroxymethylglycinate; Sodium Isostearoamphoacetate; Sodium Isostearoamphopropionate; Sodium Lauraminopropionate; Sodium Lauraminodipropionate; Sodium Lauroamphoacetate; Sodium Lauroamphohydroxypropylsulfonate; Sodium Lauroampho PG-Acetate Phosphate; Sodium Lauroamphopropionate; Sodium Lauroyl Aspartate; Sodium Lauroyl Collagen Amino Acids; Sodium Lauroyl Glutamate; Sodium Lauroyl Hydrolyzed Collagen; Sodium Lauroyl Hydrolyzed Silk; Sodium Lauroyl Oat Amino Acids; Sodium Lauroyl Sarcosinate; Sodium Lauroyl Silk Amino Acids; Sodium Lauroyl Wheat Amino Acids; Sodium Milkamidopropyl PG-Dimonium Chloride Phosphate; Sodium Myristoamphoacetate; Sodium Myristoyl Hydrolyzed Collagen; Sodium Myristoyl Isethionate; Sodium Myristoyl Sarcosinate; Sodium Oleoamphoacetate; Sodium Oleoamphohydroxypropylsulfonate; Sodium Oleoamphopropionate; Sodium Oleoyl Hydrolyzed Collagen; Sodium Oleoyl Isethionate; Sodium Palmitoyl Chondroitin Sulfate; Sodium Palmitoyl Hydrolyzed Collagen; Sodium Palmitoyl Hydrolyzed Wheat Protein; Sodium Pantothenate; Sodium PCA; Sodium PG-Propyl Thiosulfate Dimethicone; Sodium Polyaspartate; Sodium Polyglutamate; Sodium Ricinoleoamphoacetate; Sodium Soy Hydrolyzed Collagen; Sodium Stearoamphoacetate; Sodium Stearoamphohydroxypropyl-sulfonate; Sodium Stearoamphopropionate; Sodium Stearoyl Casein; Sodium Stearoyl Chondroitin Sulfate; Sodium Stearoyl Glutamate; Sodium Stearoyl Hyaluronate; Sodium Stearoyl Hydrolyzed Collagen; Sodium Stearoyl Hydrolyzed Corn Protein; Sodium Stearoyl Hydrolyzed Silk; Sodium Stearoyl Hydrolyzed Soy Protein; Sodium Stearoyl Hydrolyzed Wheat Protein; Sodium Stearoyl Lactalbumin; Sodium Stearoyl Oat Protein; Sodium Stearoyl Pea Protein; Sodium Stearoyl Soy Protein; Sodium Tallamphopropionate; Sodium Tallowamphoacetate; Sodium/TEA-Lauroyl Collagen Amino Acids; SodiumTEA-Lauroyl Hydrolyzed Collagen; Sodium/TEA-Lauroyl Hydrolyzed Keratin; Sodium/TEA-Lauroyl Keratin Amino Acids; Sodium/TEA-Undecylenoyl Alginate; Sodium/TEA-Undecylenoyl Carrageenan;

Sodium/TEA-Undecylenoyl Collagen Amino Acids; Sodium/TEA-Undecylenoyl Hydrolyzed Collagen; Sodium/TEA-Undecylenoyl Hydrolyzed Corn Protein; Sodium/TEA-Undecylenoyl Hydrolyzed Soy Protein; Sodium/TEA-Undecylenoyl Hydrolyzed Wheat Protein; Sodium Undecylenoamphoacetate; Sodium Undecylenoampho-propionate; Sodium Wheat Germamphoacetate; Soluble Collagen; Soluble Proteoglycan; Soyamidoethyldimonium/Trimonium Hydroxypropyl Hydrolyzed Wheat Protein; Soyamidopropyl Betaine; Soybean (Glycine Soja) Oil Unsaponifiables; Soybean (Glycine Soja) Protein; Soybean Lipid; Soy Dihydroxypropyldimonium Glucoside; Soydimonium Hydroxypropyl Hydrolyzed Wheat Protein; Soyethyldimonium Ethosulfate; Soy Hydroxyethyl Imidazoline; Soytrimonium Chloride; Squalane; Squalene; Stearalkonium Dimethicone Copolyol Phthalate; Stearamidoethyl Diethylamine; Stearamidoethyl Diethylamine Phosphate; Stearamidopropylamine Oxide; Stearamidopropyl Betaine; Stearamidopropyl Dimethylamine; Stearamidopropyl Dimethylamine Lactate; Stearamidopropyl Dimethylamine Stearate; Stearamidopropyl Ethyldimonium Ethosulfate; Stearamidopropyl PG-Dimonium Chloride Phosphate; Stearamidopropyl Pyrrolidonylmethyl Dimonium Chloride; Stearamidopropyl Trimonium Methosulfate; Stearamine Oxide; Steardimonium Hydroxypropyl Hydrolyzed Casein; Steardimonium Hydroxypropyl Hydrolyzed Collagen; Steardimonium Hydroxypropyl Hydrolyzed Keratin; Steardimonium Hydroxypropyl Hydrolyzed Rice Protein; Steardimonium Hydroxypropyl Hydrolyzed Silk; Steardimonium Hydroxypropyl Hydrolyzed Vegetable Protein; Steardimonium Hydroxypropyl Hydrolyzed Wheat Protein; Stearoyl Glutamic Acid; Stearoyl Leucine; Stearoyl PG-Trimonium Chloride; Stearoyl Sarcosine; Steartrimonium Bromide; Steartrimonium Chloride; Steartrimonium Hydroxyethyl Hydrolyzed Collagen; Steartrimonium Methosulfate; Steartrimonium Saccharinate; Stearyl/Aminopropyl Methicone Copolymer; Stearyl Betaine; Stearyl Hydroxyethyl Imidazoline; Stearyl Hydroxyethyl-imidonium Chloride; Stearyl Octyldimonium Chloride; Stearyl Octyldimonium Methosulfate; Stearyl PG-Dimonium Chloride Phosphate; Sulfur; Sulfurized Hydrolyzed Corn Protein; Sulfurized TEA-Ricinoleate; Sunflower (Helianthus Annuus) Seed Oil Unsaponifiables; Sweet Almond (Prunus Amygdalus; Dulcis) Protein; Tall Oil Benzyl Hydroxyethyl Imidazolinium Chloride; Tall Oil Hydroxyethyl Imidazoline; Tallowamidopropylamine Oxide; Tallowamidopropyl Betaine; Tallowamidopropyl Hydroxysultaine; Tallowamine 0xide; Tallow Betaine; Tallow Dihydroxyethyl Betaine; Tallow Hydroxyethyl Imidazoline; Tallowtrimonium Chloride; TEA-Abietoyl Hydrolyzed Collagen; TEA-Cocoyl Glutamate; TEA-Cocoyl Hydrolyzed Collagen; TEA-Cocoyl Hydrolyzed Soy Protein; TEA-Cocoyl Sarcosinate; TEA-Hydrogenated Tallowoyl Glutamate; TEA-Isostearoyl Hydrolyzed Collagen; TEA-Lauraminopropionate; TEA-Lauroyl Collagen Amino Acids; TEA-Lauroyl Glutamate; TEA-Lauroyl Hydrolyzed Collagen; TEA-Lauroyl Keratin Amino Acids; TEA-Lauroyl Sarcosinate; TEA-Myristaminopropionate; TEA-Myristoyl Hydrolyzed Collagen; TEA-Oleoyl Hydrolyzed Collagen; TEA-Oleoyl Sarcosinate; TEA-Palm Kernel Sarcosinate; TEA-Undecylenoyl Hydrolyzed Collagen; Tetrabutoxypropyl Trisiloxane; Thenoyl Methionate; Thiodiglycolamide; Threonine; Tricetylmonium Chloride; Triethonium Hydrolyzed Collagen Ethosulfate; Trimethylsilyamodimethicone; Trioctanoin; TriPABA Panthenol; Trisodium Lauroampho PG-Acetate Chloride Phosphate; Triundecanoin; Tryptophan; Tyrosine; Undecylenamide DEA; Undecylenamide MEA; Undecylenamido-propylamine Oxide; Undecylenamidopropyl Betaine; Undecylenamidopropyltrimonium Methosulfate; Undecylenoyl Hydrolyzed Collagen; Undecylenoyl Wheat Amino Acids; Undecylenoyl Xanthan Gum; Valine; Vegetable Oil; Wheat Amino Acids; Wheat Germamidopropalkonium Chloride; Wheat

Germamidopropylamine Oxide; Wheat Germamidopropyl Betaine; Wheatgermamidopropyl Dimethylamine Hydrolyzed Collagen; Wheatgermamidopropyl Dimethylamine Hydrolyzed Wheat Protein; Wheat Germamidopropyldimonium Hydroxypropyl Hydrolyzed Wheat Protein; Wheat Germamidopropyl Epoxypropyldimonium Chloride; Wheatgermamidopropyl Ethyldimonium Ethosulfate; Wheat (Triticum Vulgare) Germ Oil Unsaponifiables; Wheat (Triticum Vulgare) Germ Protein; Wheat (Triticum Vulgare) Gluten; Wheat (Triticum Vulgare) Protein; Whey Protein; Yogurt; Zein; Zinc Hydrolyzed Collagen.

Antistatic agents can sometimes also be used as hair conditioning agents. Antistatic agents are agents reduce static electricity by neutralizing electrical charge on a surface. Antistatic agents include: acetamide MEA; acetamidoethoxybutyl trimonium chloride; acetamidopropyl trimonium chloride; acetum; acetylated lanolin; acetylated lanolin alcohol; acetylated lanolin ricinoleate; acetylmethionyl methylsilanol elastinate; acrylamide/sodium acrylate copolymer; acrylamides copolymer; acrylates/ammonium methacrylate copolymer acrylates/pvp copolymer; acrylates copolymer; adipic acid/dimethylaminohydroxypropyl diethylenetriamine copolymer; adipic acid/epoxypropyl diethylenetriamine copolymer; alanine; allantoin acetyl methionine; almondamidopropalkonium chloride; almonda-midopropyl dimethylamine; aluminum capryloyl hydrolyzed collagen; aluminum undecylenoyl collagen amino acids; aminoethylacrylate phosphate/acrylates copolymer, aminopropyl laurylglutamine; ammonium acrylates copolymer; ammonium caseinate; ammonium hydrolyzed collagen; ammonium lauroyl sarcosinate; ammonium VA/acrylates copolymer; amodimethicone; amodimethicone/dimethicone copolyol; amp-isostearoyl hydrolyzed collagen; apricotamidopropyl ethyldimonium ethosulfate; arginine; asparagine; aspartic acid; avocadamidopropalkonium chloride; avocadamidopropyl dimethylamine; babassuamidopropalkonium chloride; babassuamidopropyl dimethylamine; behenalkonium chloride; behenamidopropyl dimethylamine; behenamidopropyl dimethylamine behenate; behenamidopropyl dimethylamine lactate; behenamidopropyl ethyldimonium ethosulfate; behenamidopropyl PG-dimonium chloride; behenoyl PG-trimonium chloride; behentrimonium methosulfate; behenyl betaine; behenyl hydroxyethyl imidazoline; benzyl nicotinate; benzyl triethyl ammonium chloride; benzyltrimonium hydrolyzed collagen; betaine; bishydroxyethyl dihydroxypropyl stearaminium chloride; butyl ester of ethylene/MA copolymer butyl ester of PVM/MA copolymer; C12-15 alkyl salicylate; C12-16 alcohols; C14-20 isoalkylamidopropylethyldimonium ethosulfate; C18-22 isoalkylamidopropylethyl-dimonium ethosulfate; calcium pantothenate; calcium pantothenate; canolamidopropyl ethyldimonium ethosulfate; capramide DEA; capryl hydroxyethyl imidazoline; capryloyl collagen amino acids; capryloyl hydrolyzed collagen; capryloyl hydrolyzed keratin; capryloyl keratin amino acids; caprylyl hydroxyethyl imidazoline; carpronium chloride; casein; ceresin; cetethyl morpholinium ethosulfate; cetethyldimonium bromide; cetrimonium methosulfate; cetrimonium saccharinate; cetrimonium tosylate; cetyl betaine; cetyl pyrrolidonylmethyl dimonium chloride; cetylpyridinium chloride; cholecalciferol polypeptide; cocamidopropyl dimethylamine; cocamidopropyl dimethylamine hydrolyzed collagen; cocamidopropyl dimethylamine propionate; cocamidopropyl dimethylaminohydroxypropyl hydrolyzed collagen; cocamidopropyl dimethylammonium C8-16 isoalkylsuccinyl lactoglobulin sulfonate; cocamidopropyl ethyldimonium ethosulfate; cocamidopropyl morpholine; cocamidopropyl morpholine lactate; cocamidopropyl PG-dimonium chloride; cocamidopropyl PG-dimonium chloride phosphate; cocamidopropyldimonium hydroxypropyl hydrolyzed collagen; cocamidopropyltrimonium chloride; cocamine oxide; coco/oleamidopropyl betaine coco-ethyldimonium ethosulfate; coco-hydroxysultaine;

coco-morpholine oxide; cocoalkonium chloride; cocodimonium hydroxypropyl hydrolyzed casein; cocodimonium hydroxypropyl hydrolyzed collagen; cocodimonium hydroxypropyl hydrolyzed hair keratin; cocodimonium hydroxypropyl hydrolyzed keratin; cocodimonium hydroxypropyl hydrolyzed rice protein; cocodimonium hydroxypropyl hydrolyzed silk; cocodimonium hydroxypropyl hydrolyzed soy protein; cocodimonium hydroxypropyl hydrolyzed wheat protein; cocodimonium hydroxypropyl silk amino acids; cocotrimonium chloride; cocoyl benzyl hydroxyethyl imidazolinium chloride; cocoyl hydrolyzed collagen; cocoyl hydrolyzed keratin; cocoyl hydrolyzed soy protein; cocoyl polyglyceryl-4 hydroxypropyl dihydroxyethylamine; corn starch/acrylamide/sodium acrylate copolymer; cyclomethicone; cysteine; cystine; DEA-lauraminopropionate; DEA-linoleate; decyl betaine; decylamine oxide; dibehenyl/diarachidyl dimonium chloride; dibehenyl methylamine; dibehenyldimonium chloride; dibehenyldimonium methosulfate; dicapryl/dicaprylyl dimonium chloride dicapryloyl cystine; dicetyldimonium chloride; dicocodimonium chloride; dicocoylethyl hydroxyethylmonium methosulfate; didecyldimonium chloride; diethyl aspartate; diethyl glutamate; diethylaminoethyl PEG-5 laurate; diethylene tricaseinamide; dihydrogenated tallow benzylmonium chloride; dihydrogenated tallow benzylmonium hectorite; dihydrogenated tallow hydroxyethylmonium methosulfate; dihydrogenated tallowamidoethyl hydroxyethylmonium chloride; dihydrogenated tallowamidoethyl hydroxyethylmonium methosulfate; dihydrogenated tallowdimonium chloride; dihydrogenated tallowethyl hydroxyethylmonium methosulfate; dihydrogenated tallowoylethyl hydroxyethylmonium methosulfate; dihydroxyethyl C12-15 alkoxypropylamine oxide; dihydroxyethyl cocamine oxide; dihydroxyethyl soya glycinate; dihydroxyethyl stearamine oxide; dihydroxyethyl stearyl glycinate; dihydroxyethyl tallowamine oxide; dilaureth-4 dimonium chloride; dilauryl acetyl dimonium chloride; dilauryldimonium chloride; dilinoleamidopropyl dimethylamine; dimethicone copolyol; dimethicone propyl PG-betaine; dimethyl aspartic acid; dimethyl behenamine; dimethyl cystinate; dimethyl glutamic acid; dimethyl glutarate; dimethyl lauramine; dimethyl lauramine oleate; dimethyl myristamine; dimethyl palmitamine; dimethyl soyamine; dimethyl stearamine; dioctylamine; dioctyldodecyl dodecanedioate; dioleoyl edthp-monium methosulfate; dioleyl edthp-monium methosulfate; dipalmitoyl cystine; dipalmitoyl hydroxyproline; dipalmitoylethyl hydroxyethylmonium methosulfate; dipalmoylethyl hydroxyethylmonium methosulfate; disodium caproamphodiacetate; disodium capryloamphodiacetate; disodium hydrogenated cottonseed glyceride sulfosuccinate; disodium lauriminodipropionate; disodium lauroamphodiacetate; disodium lauroamphodipropionate; disodium oleamido MIPA-sulfosuccinate; disodium steariminodipropionate; disodium stearoamphodiacetate; disoyadimonium chloride; distearoylethyl hydroxyethylmonium methosulfate; distearyldimonium chloride; ditallowamidoethyl hydroxypropylmonium methosulfate; ditallowdimonium chloride; ditallowethyl hydroxyethylmonium methosulfate; ditallowoylethyl hydroxyethylmonium methosulfate; ditridecyldimonium chloride; docosahexaenoic acid; dodecylbenzyltrimonium chloride; dodecylxylylditrimonium chloride; erucalkonium chloride; erucamidopropyl hydroxysultaine; ethyl aspartate; ethyl ester of hydrolyzed animal protein; ethyl ester of hydrolyzed keratin; ethyl ester of hydrolyzed silk; ethyl ester of PVM/MA copolymer; ethyl glutamate; ethyl hydroxymethyl oleyl oxazoline; ethyl PEG-15 cocamine sulfate; ethyl serinate; gelatin/keratin amino acids/lysine hydroxypropyl trimonium chloride; gelatin/lysine/polyacrylamide hydroxypropyltrimonium chloride; ginseng hydroxypropyltrimonium chloride; glucosamine HCl; glutamic acid; glutamic acid; glutamine; glyceryl

distearate; glyceryl lanolate; glycine; glycol oleate; glycol ricinoleate; guar hydroxypropyltrimonium chloride; hair keratin amino acids; hexadimethrine chloride; hexyl nicotinate; hinokitiol; histidine; hyaluronic acid; hydrogenated lanolin; hydrogenated tallowalkonium chloride; hydrogenated tallowamine oxide; hydrogenated tallowtrimonium chloride; hydrolyzed albumen; hydrolyzed casein; hydrolyzed collagen; hydrolyzed corn protein; hydrolyzed elastin; hydrolyzed hair keratin; hydrolyzed human placental protein; hydrolyzed keratin; hydrolyzed lupine protein; hydrolyzed milk protein; hydrolyzed oat protein; hydrolyzed oats; hydrolyzed pea protein; hydrolyzed placental protein; hydrolyzed potato protein; hydrolyzed rice bran protein; hydrolyzed rice protein; hydrolyzed serum protein; hydrolyzed silk; hydrolyzed soy protein; hydrolyzed spinal protein; hydrolyzed sweet almond protein; hydrolyzed vegetable protein; hydrolyzed wheat protein; hydrolyzed yeast protein; hydrolyzed zein; hydroxycetyl hydroxyethyl dimonium chloride; hydroxyethyl cetyldimonium chloride; hydroxyethyl cetyldimonium phosphate; hydroxyethyl stearamide-mipa; hydroxylated lanolin; hydroxyproline; hydroxypropyl biscetearyldimonium chloride; hydroxypropyl bisisostearamidopropyldimonium chloride; hydroxypropyl bisoleyldimonium chloride; hydroxypropyl bisstearyldimonium chloride; hydroxypropyl guar; hydroxypropyl guar hydroxypropyltrimonium chloride; hydroxypropyltrimonium amylopectin/glycerin crosspolymer; hydroxypropyltrimonium gelatin; hydroxypropyltrimonium hydrolyzed casein; hydroxypropyltrimonium hydrolyzed collagen; hydroxypropyltrimonium hydrolyzed keratin; hydroxypropyltrimonium hydrolyzed rice bran protein; hydroxypropyltrimonium hydrolyzed silk; hydroxypropyltrimonium hydrolyzed soy protein; hydroxypropyltrimonium hydrolyzed vegetable protein; hydroxypropyltrimonium hydrolyzed wheat protein; hydroxystearamide MEA; hydroxystearamidopropyl trimonium chloride; hydroxystearamidopropyl trimonium methosulfate; hydroxystearyl methylglucamine; inositol; isobutylated lanolin oil; isodecyl isononanoate; isodecyl salicylate; isoleucine; isononamidopropyl ethyldimonium ethosulfate; isononyl isononanoate; isopropyl ester of PVM/MA copolymer; isopropyl lanolate; isopropyl palmitate; isostearamide DEA; isostearamide MEA; isostearamide MIPA; isostearamidopropyl betaine; isostearamidopropyl dimethylamine; isostearamidopropyl dimethylamine gluconate; isostearamidopropyl dimethylamine glycolate; isostearamidopropyl dimethylamine lactate; isostearamidopropyl epoxypropyl dimonium chloride; isostearamidopropyl ethyldimonium ethosulfate; isostearamidopropyl ethylmorpholinium ethosulfate; isostearamidopropyl laurylacetodimonium chloride; isostearamidopropyl morpholine; isostearamidopropyl morpholine lactate; isostearamidopropyl PG-dimonium chloride; isostearaminopropalkonium chloride; isostearoyl hydrolyzed collagen; isostearoyl PG-trimonium chloride; isostearyl benzylimidonium chloride; isostearyl diglyceryl succinate; isostearyl ethyldimonium chloride; isostearyl ethylimidonium ethosulfate; isostearyl hydroxyethyl imidazoline; keratin amino acids; lactamide MEA; lactamidopropyl trimonium chloride; lactoglobulin; lactoyl methylsilanol elastinate; lanolin; lanolin alcohol; lanolin cera; lanolin linoleate; lanolin ricinoleate; lanosterol; lapyrium chloride; lauramide DEA; lauramide MEA; lauramide MIPA; lauramidopropyl acetamidodimonium chloride; lauramidopropyl betaine; lauramidopropyl dimethylamine; lauramidopropyl dimethylamine propionate; lauramidopropyl PG-dimonium chloride; lauramidopropylamine oxide; lauramine; lauramine oxide; lauraminopropionic acid; laurdimonium hydroxypropyl hydrolyzed soy protein; laurdimonium hydroxypropyl hydrolyzed wheat protein; lauroyl collagen amino acids; lauroyl hydrolyzed collagen; lauroyl PG-trimonium chloride; lauroyl sarcosine; laurtrimonium bromide; laurtrimonium trichlorophenoxide; lauryl aminopropylglycine; lauryl betaine; lauryl

diethylenediaminoglycine; lauryl dimethylamine cyclocarboxypropyloleate; lauryl glycol; lauryl hydroxyethyl imidazoline; lauryl isoquinolinium bromide; lauryl isoquinolinium saccharinate; lauryl methyl gluceth-10 hydroxypropyldimonium chloride; lauryl myristate; lauryl palmitate; lauryl sultaine; lauryldimonium hydroxypropyl hydrolyzed casein; lauryldimonium hydroxypropyl hydrolyzed collagen; lauryldimonium hydroxypropyl hydrolyzed keratin; lauryldimonium hydroxypropyl hydrolyzed silk; lauryldimonium hydroxypropyl hydrolyzed soy protein; lauryldimonium hydroxypropyl hydrolyzed wheat protein; laurylpyridinium chloride; lecithin; lecithinamide DEA; leucine; linoleamide; linoleamide DEA; linoleamide MEA; linoleamide MIPA; linoleamidopropalkonium chloride; linoleamidopropyl dimethylamine; linoleamidopropyl dimethylamine dimer dilinoleate; linoleamidopropyl dimethylamine lactate; linoleamidopropyl ethyldimonium ethosulfate; linoleamidopropyl PG-dimonium chloride phosphate; linoleic acid; linolenic acid; lysine; lysine; lysine PCA; methacryloyl ethyl betaine/acrylates copolymer; methenammonium chloride; methicone; methionine; methyl aspartic acid; methyl glutamic acid; methyl hydroxycetyl glucaminium lactate; methyl hydroxymethyl oleyl oxazoline; methylbenzethonium chloride; methylenebis tallow acetamidodimonium chloride; methylsilanol acetylmethionate; methylsilanol acetyltyrosine; methylsilanol elastinate; methylsilanol hydroxyproline; methylsilanol hydroxyproline aspartate; methylsilanol mannuronate; milk amino acids; minkamidopropalkonium chloride; minkamidopropyl dimethylamine; minkamidopropyl ethyldimonium ethosulfate; monosaccharide lactate condensate; montan acid wax; montan cera; myristamide DEA; myristamide MEA; myristamide MIPA; myristamidopropyl betaine; myristamidopropyl dimethylamine; myristamidopropylamine oxide; myristamine oxide; myristaminopropionic acid; myristoyl hydrolyzed collagen; myristoyl sarcosine; myristyl betaine; myristyl hydroxyethyl imidazoline; niacin; norvaline; norvaline; norvaline; octylacrylamide/acrylates/ butylaminoethyl methacrylate copolymer; octyldecyl trimonium chloride; octyldodecyltrimonium chloride; oleamide DEA; oleamide MEA; oleamide MIPA; oleamidopropyl betaine; oleamidopropyl dimethylamine; oleamidopropyl dimethylamine glycolate; oleamidopropyl dimethylamine hydrolyzed collagen; oleamidopropyl dimethylamine lactate; oleamidopropyl dimethylamine propionate; oleamidopropyl ethyldimonium ethosulfate; oleamidopropyl hydroxysultaine; oleamidopropyl PG-dimonium chloride; oleamidopropylamine oxide; oleamidopropyldimonium hydroxypropyl hydrolyzed collagen; oleamine; oleamine bishydroxypropyltrimonium chloride; oleamine oxide; oleoyl hydrolyzed collagen; oleoyl PG-trimonium chloride; oleoyl sarcosine; oleyl betaine; oleyl hydroxyethyl imidazoline; oleyl lanolate; olivamidopropyl dimethylamine; olivamidopropyl dimethylamine lactate; oryzanol; ouricury wax; palm kernelamidopropyl betaine; palmamidopropyl betaine; palmitamide DEA; palmitamide MEA; palmitamidopropyl betaine; palmitamidopropyl diethylamine; palmitamidopropyl dimethylamine; palmitamidopropyl dimethylamine lactate; palmitamidopropyl dimethylamine propionate; palmitamidopropylamine oxide; palmitamine; palmitamine oxide; palmitoleamidopropyl dimethylamine lactate; palmitoleamidopropyl dimethylamine propionate; palmitoyl collagen amino acids; palmitoyl hydrolyzed collagen; palmitoyl hydrolyzed milk protein; palmitoyl keratin amino acids; palmitoyl PG-trimonium chloride; panthenol; panthenyl ethyl ether; panthenyl ethyl ether acetate; panthenyl hydroxypropyl steardimonium chloride; panthenyl triacetate; pantothenic acid; pantothenic acid polypeptide; paraffinum liquidum; PCA ethyl cocoyl arginate; PEG-10 coco-benzonium chloride; PEG-10 coconut oil esters; PEG-10 stearamine; PEG-10 stearyl benzonium chloride; PEG-105 behenyl propylenediamine; PEG-15 cocomonium chloride; PEG-15

cocopolyamine; PEG-15 oleammonium chloride; PEG-15 stearamine; PEG-15 stearmonium chloride; PEG-15 tallow polyamine; PEG-2 coco-benzonium chloride; PEG-2 cocomonium chloride; PEG-2 milk solids; PEG-2 oleammonium chloride; PEG-2 stearamine; PEG-2 stearmonium chloride; PEG-20 tallow ammonium ethosulfate; PEG-25 diethylmonium chloride; PEG-3 lauramine oxide; PEG-3 tallow propylenedimonium dimethosulfate; PEG-5 cocomonium methosulfate; PEG-5 ditridecylmonium chloride; PEG-5 stearamine; PEG-5 stearyl ammonium chloride; PEG-5 stearyl ammonium lactate; PEG-5 tall oil sterol ether; PEG-5 tallow benzonium chloride; PEG-50 stearamine; PEG-8 palmitoyl methyl diethonium methosulfate; petrolatum; PG-hydroxyethylcellulose cocodimonium chloride; PG-hydroxyethylcellulose lauryldimonium chloride; PG-hydroxyethylcellulose stearyldimonium chloride; phenyl trimethicone; phenylalanine; phenylalanine; phosphatidylcholine; phthalic anhydride/glycerin/glycidyl decanoate copolymer pix ex carbone; polyacrylamide; polybutylene terephthalate; polyethylacrylate; polyethylene; polymethacrylamidopropyl-trimonium chloride; polyquaternium-1; polyquaternium-10; polyquaternium-11; polyquaternium-12; polyquaternium-13; polyquaternium-14; polyquaternium-15; polyquaternium-16; polyquaternium-17; polyquaternium-18; polyquaternium-19; polyquaternium-2; polyquaternium-20; polyquaternium-22; polyquaternium-24; polyquaternium-27; polyquaternium-28; polyquaternium-29; polyquaternium-30; polyquaternium-31; polyquaternium-32; polyquaternium-33; polyquaternium-34; polyquaternium-35; polyquaternium-36; polyquaternium-37; polyquaternium-39; polyquaternium-4; polyquaternium-42; polyquaternium-5; polyquaternium-6; polyquaternium-7; polyquaternium-8; polyquaternium-9; polysilicone-7; polyvinyl acetate; polyvinyl butyral; polyvinyl imidazolinium acetate; polyvinyl methyl ether; potassium caseinate; potassium cocoyl hydrolyzed casein; potassium cocoyl hydrolyzed collagen; potassium cocoyl hydrolyzed keratin; potassium cocoyl hydrolyzed rice bran protein; potassium cocoyl hydrolyzed rice protein; potassium cocoyl hydrolyzed silk; potassium cocoyl hydrolyzed soy protein; potassium cocoyl hydrolyzed wheat protein; potassium lauroyl collagen amino acids; potassium lauroyl hydrolyzed collagen; potassium lauroyl hydrolyzed soy protein; potassium lauroyl wheat amino acids; potassium lauryl hydroxypropyl sulfonate; potassium myristoyl hydrolyzed collagen; potassium oleoyl hydrolyzed collagen; potassium stearoyl hydrolyzed collagen; potassium tallate; potassium undecylenoyl hydrolyzed collagen; PPG-12-buteth-16; PPG-14 butyl ether; PPG-15 butyl ether; PPG-15-buteth-20; PPG-16 butyl ether; PPG-18 butyl ether; PPG-2-buteth-3; PPG-20 methyl glucose ether; PPG-20-buteth-30; PPG-22 butyl ether; PPG-24-buteth-27; PPG-25 diethylmonium chloride; PPG-26-buteth-26; PPG-28-buteth-35; PPG-3 tallow aminopropylamine; PPG-3-buteth-5; PPG-30 butyl ether; PPG-33 butyl ether; PPG-33-buteth-45; PPG-4 butyl ether; PPG-40 butyl ether; PPG-40 diethylmonium chloride; PPG-5 butyl ether; PPG-5-buteth-7; PPG-53 butyl ether; PPG-7-buteth-10; PPG-9 butyl ether; PPG-9 diethylmonium chloride; PPG-9-buteth-12; proline; proline; propyltrimonium hydrolyzed collagen; propyltrimonium hydrolyzed soy protein; propyltrimonium hydrolyzed wheat protein; PVM/MA copolymer; PVP/dimethylaminoethylmethacrylate copolymer; PVP/eicosene copolymer; PVP/hexadecene copolymer; PVP/VA/itaconic acid copolymer; PVP/VA/vinyl propionate copolymer; PVP/va copolymer; pyridoxine; pyridoxine dicaprylate; pyridoxine dilaurate; pyridoxine dioctenoate; pyridoxine dipalmitate; pyridoxine HCl; pyridoxine tripalmitate; quaternium-1; quaternium-14; quaternium-16; quaternium-18; quaternium-18 methosulfate; quaternium-22; quaternium-24; quaternium-26; quaternium-27; quaternium-30; quaternium-33; quaternium-43; quaternium-45; quaternium-51; quaternium-52; quaternium-53; quaternium-56; quaternium-60;

quaternium-61; quaternium-62; quaternium-63; quaternium-70; quaternium-71; quaternium-72; quaternium-73; quaternium-75; quaternium-76 hydrolyzed collagen; quaternium-77; quaternium-78; quaternium-79 hydrolyzed collagen; quaternium-79 hydrolyzed keratin; quaternium-79 hydrolyzed milk protein; quaternium-79 hydrolyzed silk; quaternium-79 hydrolyzed soy protein; quaternium-79 hydrolyzed wheat protein; quaternium-8; quaternium-80; quaternium-81; quaternium-82; quaternium-83; quaternium-84; quaternium-85; rapeseedamidopropyl benzyldimonium chloride; rapeseedamidopropyl epoxypropyl dimonium chloride; rapeseedamidopropyl ethyldimonium ethosulfate; resorcinol acetate; ricinoleamide DEA; ricinoleamide MEA; ricinoleamide MIPA; ricinoleamidopropyl betaine; ricinoleamidopropyl dimethylamine; ricinoleamidopropyl dimethylamine lactate; ricinoleamidopropyl ethyldimonium ethosulfate; ricinoleamidopropyltrimonium chloride; ricinoleamidopropyltrimonium methosulfate; safflowerамidopropyl ethyldimonium ethosulfate; serica; sericin; serine; silicone quaternium-1; silicone quaternium-2; silicone quaternium-3; silicone quaternium-4; silicone quaternium-5; silicone quaternium-6; silicone quaternium-7; silicone quaternium-8; silicone quaternium-9; sine adipe lac; sodium/TEA-lauroyl collagen amino acids; sodium/TEA-lauroyl hydrolyzed collagen; sodium/TEA-lauroyl hydrolyzed keratin; sodium/TEA-lauroyl keratin amino acids; sodium/TEA-undecylenoyl collagen amino acids; sodium/TEA-undecylenoyl hydrolyzed collagen; sodium acrylate/vinyl alcohol copolymer; sodium carrageenan; sodium caseinate; sodium chondroitin sulfate; sodium cocoyl collagen amino acids; sodium cocoyl hydrolyzed collagen; sodium cocoyl hydrolyzed keratin; sodium cocoyl hydrolyzed rice protein; sodium cocoyl hydrolyzed soy protein; sodium isethionate; sodium lauraminopropionate; sodium lauriminodipropionate; sodium lauroamphohydroxypropylsulfonate; sodium lauroamphopropionate; sodium lauroyl collagen amino acids; sodium lauroyl glutamate; sodium lauroyl hydrolyzed collagen; sodium lauroyl hydrolyzed silk; sodium lauroyl isethionate; sodium lauroyl sarcosinate; sodium lauroyl taurate; sodium lauroyl wheat amino acids; sodium methyl oleoyl taurate; sodium myristoamphoacetate; sodium myristoyl hydrolyzed collagen; sodium myristoyl isethionate; sodium myristoyl sarcosinate; sodium oleoamphoacetate; sodium oleoamphopropionate; sodium oleoyl hydrolyzed collagen; sodium oleoyl isethionate; sodium PCA; sodium PCA; sodium soya hydrolyzed collagen; sodium stearoamphoacetate; sodium stearoyl hydrolyzed collagen; sodium tallamphopropionate; sodium urocanate; soluble collagen; soy dihydroxypropyldimonium polyglucose; soyaethyl morpholinium ethosulfate; soyamidopropalkonium chloride; soyamidopropyl ethyldimonium ethosulfate; soyamine; soydimonium hydroxypropyl hydrolyzed wheat protein; soyethyldimonium ethosulfate; soytrimonium chloride; squalene; starch diethylaminoethyl ether; steapyrium chloride; stearamide DEA; stearamide MEA; stearamide MEA-stearate; stearamide MIPA; stearamidoethyl diethanolamine; stearamidoethyl diethylamine; stearamidoethyl diethylamine phosphate; stearamidoethyl ethanolamine; stearamidoethyl ethanolamine phosphate; stearamidopropalkonium chloride; stearamidopropyl betaine; stearamidopropyl cetearyl dimonium tosylate; stearamidopropyl dimethylamine; stearamidopropyl dimethylamine lactate; stearamidopropyl ethyldimonium ethosulfate; stearamidopropyl morpholine; stearamidopropyl morpholine lactate; stearamidopropyl PG-dimonium chloride phosphate; stearamidopropyl pyrrolidonylmethyl dimonium chloride; stearamidopropyl trimonium methosulfate; stearamidopropylamine oxide; stearamine; stearamine oxide; steardimonium hydroxypropyl hydrolyzed casein; steardimonium hydroxypropyl hydrolyzed collagen; steardimonium hydroxypropyl hydrolyzed keratin; steardimonium hydroxypropyl hydrolyzed rice protein; steardimonium hydroxypropyl hydrolyzed silk; steardimonium

hydroxypropyl hydrolyzed vegetable protein; steardimonium hydroxypropyl hydrolyzed wheat protein; stearoyl PG-trimonium chloride; stearoyl sarcosine; steartrimonium hydroxyethyl hydrolyzed collagen; steartrimonium methosulfate; stearyl betaine; stearyl hydroxyethyl imidazoline; stearyl hydroxyethylimidonium chloride; stearyl octyldimonium chloride; stearyl octyldimonium methosulfate; stearylvinyl ether/MA copolymer; sucrose cocoate; sulfur; synthetic wax; tall oil benzyl hydroxyethyl imidazolinium chloride; tall oil hydroxyethyl imidazoline; tallamide DEA; tallow trihydroxyethylammonium acetate; tallowalkonium chloride; tallowamide DEA; tallowamide MEA; tallowamidopropylamine oxide; tallowamine oxide; tallowdimonium propyltrimonium dichloride; tallowtrimonium chloride; TEA-abietoyl hydrolyzed collagen; TEA-cocoyl hydrolyzed collagen; TEA-cocoyl hydrolyzed soy protein; TEA-lauraminopropionate; TEA-lauroyl keratin amino acids; TEA-lauroyl sarcosinate; TEA-myristaminopropionate; TEA-myristoyl hydrolyzed collagen; TEA-oleoyl hydrolyzed collagen; TEA-oleoyl sarcosinate; TEA-palm kernel sarcosinate; TEA-undecylenoyl hydrolyzed collagen; tetrabutyl ammonium bromide; thenoyl methionate; threonine; threonine; tricetylmonium chloride; tridecyl salicylate; triethonium hydrolyzed collagen ethosulfate; trilaurylamine; trimethylsilylamodimethicone; trioctanoin; tripaba panthenol; trisodium lauroampho PG-acetate phosphate chloride; tristearyl PG-phosphate dimonium chloride; triundecanoin; tryptophan; tryptophan; tyrosine; undecylenamide DEA; undecylenamide MEA; undecylenamidopropyltrimonium methosulfate: undecylenoyl collagen amino acids; undecylenoyl hydrolyzed collagen; undecylenyl alcohol; urea; VA/crotonates/vinyl neodecanoate copolymer; va/crotonates copolymer; valine; wheat germamidopropalkonium chloride; wheat germamidopropyl epoxypropyldimonium chloride; wheat germamidopropylamine oxide; wheat germamidopropyldimonium hydroxypropyl hydrolyzed wheat protein; wheatgermamidopropyl dimethylamine hydrolyzed collagen; wheatgermamidopropyl dimethylamine hydrolyzed wheat protein; wheatgermamidopropyl ethyldimonium ethosulfate; zea mays; zinc hydrolyzed collagen.

In particular, cationic and amphoteric fatty acids such as polyquaternium compounds are useful as hair conditioners or fixatives. Examples of cationic amino and quaternary ammonium monomers include, for example, vinyl compounds substituted with dialkyl aminoalkyl acrylate, dialkylamino alkylmethacrylate, monoalkylaminoalkyl acrylate, monoalkylaminoalkyl methacrylate, trialkyl methacryloxyalkyl ammonium salt, trialkyl acryloxyalkyl ammonium salt, diallyl quaternary ammonium salts, and vinyl quaternary ammonium monomers having cyclic cationic nitrogen-containing rings such as pyridinium, imidazolium, and quaternized pyrrolidine, e.g., alkyl vinyl imidazolium, alkyl vinyl pyridinium, and alkyl vinyl pyrrolidine salts. The alkyl portions of these, monomers are preferably lower alkyls such as the C1-C3 alkyls, more preferably C1 and C2 alkyls.

Other compounds useful as bulking agents include: octylacrylamide/acrylates/butylaminoethyl methacrylate copolymer (a polymer of N-tert-octyl acrylamide, methyl methacrylate, hydroxypropyl methacrylate, acrylic acid and t-butyl aminoethyl methacrylate).

Other cationic conditioning compounds include quaternary nitrogen derivatives of cellulose ethers, homopolymers of dimethyldiallyl-ammonium chloride, copolymers of acrylamide and dimethyldiallylammonium chloride, homopolymers or copolymers derived from acrylic acid or methacrylic acid containing cationic nitrogen functional groups attached to the polymer via ester or amide linkages,

polycondensation products of N,N'-bis-(2,3-epoxypropyl)-piperazine or of piperazine-bis-acrylamide and piperazine, poly-(dimethylbutenylammonium chloride)-α,θ-bis-(triethanol-ammonium) chloride.

The agent can also be a hair fixative as described above. Hair fixatives are agents which impart hair-holding or style-retention properties to hair. Film formers, such as gums and polymeric substances, can also be used as hair fixatives. Examples of hair fixative agents including some film formers which are suitable hair fixatives include: Acrylamide/Ammonium Acrylate Copolymer; Acrylamides/DMAPA Acrylates/Wethoxy PEG Methacrylate Copolymer; Acrylamidopropyltrimonium Chloride/Acrylamide Copolymer; Acrylamidopropyltrimonium Chloride/Acrylates Copolymer; Acrylates/Acetoacetoxyethyl Methacrylate Copolymer; Acrylates/Acrylamide Copolymer; Acrylates/Ammonium Methacrylate Copolymer; Acrylates Copolymer; Acrylates/Octylacrylamide Copolymer; Acrylates/PVP Copolymer; Acrylates/VA Copolymer; Adipic Acid/Diethylenetriamine Copolymer; Adipic Acid/Dimethylaminohydroxypropyl Diethylenetriamine Copolymer; Adipic Acid/Epoxypropyl Diethylenetriamine Copolymer; Adipic Acid/Isophthalic Acid/Neopentyl Glycol/Trimethylolpropane Copolymer; Allyl Stearate/VA Copolymer; Aminoethylacrylate Phosphate/Acrylates Copolymer; Ammonium VA/Acrylates Copolymer; AMP-Acrylates/Diacetoneacrylamide Copolymer; AMP-Acrylates/Dimethylaminoethylmethacrylate Copolymer; AMPD-Acrylates/ Diacetoneacrylamide Copolymer; Butylated PVP; Butyl Ester of Ethylene/MA Copolymer; Butyl Ester of PVM/MA Copolymer; Calcium/Sodium PVM/MA Copolymer; Corn Starch/Acrylamide/Sodium Acrylate Copolymer; Diethylene Glycolamine/Epichiorohydrin/ Piperazine Copolymer; Ethyl Ester of PVM/MA Copolymer; Isobutylene/MA Copolymer; Isopropyl Ester of PVM/MA Copolymer; Karaya (Sterculia Urens) Gum; Lauryl Methacrylate/Glycol Dimethacrylate Copolymer; Methacryloyl Ethyl Betaine/Acrylates Copolymer; Octylacrylamide/Acrylates/Butylaminoethyl Methacrylate Copolymer; PEG-8/SMDI Copolymer; Polyacrylamide; Polybeta-alanine/Glutaric Acid Crosspolymer; Polybutylene Terephthalate; Polyethylacrylate; Polyethylene Terephthalate; Polyperfluoroperhydrophenanthrene; Polyquaternium-1; Polyquaternium-2; Polyquaternium-4; Polyquaternium-5; Polyquaternium-6; Polyquaternium-7; Polyquaternium-8; Polyquaternium-9; Polyquaternium-10; Polyquaternium-11; Polyquaternium-12 ; Polyquaternium-13; Polyquaternium-14; Polyquaternium-15; Polyquaternium-16; Polyquaternium-17; Polyquaternium-18; Polyquaternium-19 ; Polyquaternium-20; Polyquaternium-22; Polyquaternium-24; Polyquaternium-27; Polyquaternium-28; Polyquaternium-29; Polyquaternium-30; Polyquaternium-31; Polyquaternium-32; Polyquaternium-33; Polyquaternium-34; Polyquaternium-35; Polyquaternium-36; Polyquaternium-37; Polyquaternium-39; Polyquaternium-45; Polyquaternium-46; Polyquaternium-47; Polysilicone-9; Polyvinyl Acetate; Polyvinyl Butyral; Polyvinylcaprolactam; Polyvinylformamide; Polyvinyl Imidazolinium Acetate; Polyvinyl Methyl Ether; PPG-12/SMDI Copolymer PPG-51/SMDI Copolymer; PVM/MA Copolymer; PVP; PVP/Acrylates/Lauryl Methacrylate Copolymer; PVP/Dimethylarninoethylmethacrylate Copolymer; PVP/DMAPA Acrylates Copolymer; PVP/Hexadecene Copolymer; PVP/VA Copolymer; PVP/VA/Itaconic Acid Copolymer; PVP/VA/Vinyl Propionate Copolymer; PVP/Vinyl Caprolactam/DMAPA Acrylates Copolymer; Rosin Acrylate; Shellac; Sodium Polyacrylate; Terephthalic Acid/Isophthalic Acid/Sodium Isophthalic Acid Sulfonate/Glycol Copolymer; VA/Crotonates Copolymer; VA/Crotonates/Methacryloxybenzophenone-1 Copolymer; VA/Crotonates/Vinyl Neodecanoate Copolymer;

VA/Crotonates/Vinyl Propionate Copolymer; VA/DBM Copolymer; VA/Vinyl Butyl Benzoate/Crotonates Copolymer; Vinyl Caprolactam/PVP/Dimethylaminoethyl Methacrylate Copolymer; Yeast Palmitate.

Other compounds which are useful as hair fixatives include shellac, polyvinylpyrrolidone-ethyl methacrylate-methacrylic acid tarpolymer, vinyl acetate-crotonic acid copolymer, vinyl acetate-crotonic acid-vinyl neodeconate tarpolymer, poly(vinylpyrrolidone-ethylmethacrylate) methacrylic acid copolymer, vinyl methyl ether-maleic anhydride copolymer, octylacrylamide-acrylate-butylaminoethyl-methacrylate copolymer, and poly(vinylpyrrolidone-dimethylaminoethyl-methacrylate) copolymer and derivatives; thioglycollic acid and its salts and esters; potassium or sodium hydroxide; lithium hydroxide; calcium hydroxide; quinine and its salts; resorcinol; 1,3-bis(hydroxymethyl)imidazolidine-2-thione; etidronic acid and its salts (1-hydroxy-ethylidene-diphosphonic acid and its salts).

Examples of anti-foaming agents which are useful as bulking agents include: bisphenylhexamethicone; dimethicone; dimethiconol; hexamethyldisiloxane; hexyl alcohol; isopropyl alcohol; petroleum distillates; phenethyl disiloxane; phenyl trimethicone; polysilicone-7; propyl alcohol; silica dimethyl silylate; silica silylate; tetramethyl decynediol; trimethylsiloxysilicate.

The agent also can be a tissue sealant. Tissue sealants are those used in wound healing to mechanically seal wounds. The use of lysine oxidase to covalently attach such materials would add mechanical and adhesive strength to this sealant. Such tissue sealants are composed typically of fibrinogen, collagen, hyaluronic acid, synthetic peptides and the like. They also can be polylysines, or polymers of both glutamine and lysine, corneocyte proteins and the like.

The agents also can be insect repellants. A widely used insect repellant is N-N-diethyl-3-methylbenzamide. Pheromones are also useful as insect repellants.

The agent also may be cultured cells and cultured body tissues used for wound healing, cartilage replacement, corneal replacements and other like surgical procedures.

As mentioned earlier, the agent can also be a film forming agent. A film forming agent is an agent which produces a continuous film on skin, hair or nails upon application. Film forming agents are useful in wound healing or in some cases as hair fixatives, as described above. Examples of film forming agents include: acetyl tributyl citrate; acetyl triethyl citrate; acetyl trioctyl citrate; acrylamide/sodium acrylate copolymer; acrylamides/acrylates/DMAPA/methoxy PEG methacrylate copolymer; acrylamides copolymer; acrylamidopropyltrimonium chloride/acrylates copolymer; acrylates/acetoacetoxyethyl methacrylate copolymer; acrylates/acrylamide copolymer; acrylates/ammonium methacrylate copolymer; acrylates/C10-30 alkyl acrylate crosspolymer; acrylates/diacetoneacrylamide copolymer; acrylates/octylacrylamide copolymer; acrylates/PVP copolymer; acrylates/steareth-50 acrylate copolymer; acrylates/VA copolymer; acrylates/VA crosspolymer; acrylates copolymer; acrylic acid/acrylonitrogens copolymer; adipic acid/diethylene glycol/glycerin crosspolymer; adipic acid/diethylenetriamine copolymer; adipic acid/dimethylaminohydroxypropyl diethylenetriamine copolymer; adipic acid/epoxypropyl diethylenetriamine copolymer; adipic acid/isophthalic acid/neopentyl glycol/trimethylolpropane; copolymer; albumen; allyl stearate/VA copolymer; aminoethylacrylate phosphate/acrylates copolymer; ammonium acrylates/acrylonitrogens copolymer; ammonium acrylates copolymer; ammonium alginate; ammonium VA/acrylates copolymer; amp-acrylates/diacetoneacrylamide copolymer; amp-acrylates copolymer; ampd-acrylates/diacetoneacrylamide

copolymer; bayberry wax; behenyl/isostearyl beeswax; benzoic acid/phthalic anhydride/pentaerythritol/neopentyl glycol/palmitic acid copolymer; butadiene/acrylonitrile copolymer; butoxy chitosan; butyl benzoic acid/phthalic anhydride/trimethylolethane copolymer; butyl benzyl phthalate; butyl ester of ethylene/MA copolymer; butyl ester of PVM/MA copolymer; butyl phthalyl butyl glycolate; butylated polyoxymethylene urea; butylated PVP; calcium/sodium PVM/MA copolymer; calcium carrageenan; camphor; candelilla cera; carboxymethyl chitosan succinamide; carboxymethyl hydroxyethylcellulose; carnauba; cellulose acetate; cellulose acetate butyrate; cellulose acetate propionate; cellulose gum; cera alba; ceratonia siliqua; cetyl hydroxyethylcellulose; chitosan succinamide; collodion; colophonium; copaifera officinalis; copal; corn starch/acrylamide/sodium acrylate copolymer; croscarmellose; cyanopsis tetragonalba; desamido collagen; dibutyl adipate; dibutyl lauroyl glutamide; dibutyl phthalate; dibutyl sebacate; dicapryl adipate; dicetyl adipate; diethyl phthalate; diethylene glycolamine/epichlorohydrin/piperazine copolymer; diglycol/chdm/isophthalates/sip copolymer; dilinoleic acid/ethylenediamine copolymer; dimethicone/mercaptopropyl methicone copolymer; dimethicone/sodium PG-propyldimethicone thiosulfate copolymer; dimethyl phthalate; dioctyl adipate; dioctyl phthalate; dioctyl sebacate; dioctyl succinate; dmapa acrylates/acrylic acid/acrylonitrogens copolymer; dmhf; dodecanedioic acid/cetearyl alcohol/glycol copolymer; ethyl cyanoacrylate; ethyl ester of PVM/MA copolymer; ethyl tosylamide; ethylcellulose; ethylene/acrylic acid/VA copolymer; ethylene/acrylic acid copolymer; ethylene/calcium acrylate copolymer; ethylene/MA copolymer; ethylene/magnesium acrylate copolymer; ethylene/propylene copolymer; ethylene/sodium acrylate copolymer; ethylene/VA copolymer; ethylene/zinc acrylate copolymer; flexible collodion; gellan gum; glyceryl alginate; glyceryl hydrogenated rosinate; glyceryl polyacrylate; glyceryl rosinate; glycosaminoglycans; guar hydroxypropyltrimonium chloride; gutta percha; ydrogenated styrene/butadiene copolymer; hydrogenated styrene/methyl styrene/indene copolymer; ydrolyzed collagen; hydrolyzed elastin; hydrolyzed keratin; hydroxybutyl methylcellulose; hydroxyethyl ethylcellulose; hydroxyethylcellulose; hydroxylated lanolin; hydroxypropyl guar; hydroxypropyl methylcellulose; hydroxypropylcellulose; isobutylene/sodium maleate copolymer; isopropyl ester of PVM/MA copolymer; lanolin cera; lauryl acrylate/VA copolymer; lithium oxidized polyethylene; maltodextrin; melamine/formaldehyde resin; methacryloyl ethyl betaine/acrylates copolymer; methyl hydrogenated rosinate; methyl methacrylate crosspolymer; methyl rosinate; mustela; natto gum; nitrocellulose; nonoxynyl hydroxyethylcellulose; oat beta glucan; octylacrylamide/acrylates/butylaminoethyl methacrylate copolymer; oleoyl hydrolyzed collagen; ouricury wax; oxidized polypropylene; PEG-8/SMDI copolymer; PEG-crosspolymer; pentaerythrityl hydrogenated rosinate; pentaerythrityl rosinate; phthalic anhydride/adipic acid/castor oil/neopentyl glycol/PEG-3/trimethylolpropane copolymer; phthalic anhydride/benzoic acid/trimethylolpropane copolymer; phthalic anhydride/butyl benzoic acid/propylene glycol copolymer; phthalic anhydride/glycerin/glycidyl decanoate copolymer; phthalic anhydride/trimellitic anhydride/glycols copolymer; polyacrylamide; polyacrylamidomethylpropane sulfonic acid; polyacrylic acid; polybutylene terephthalate; polychlorotrifluoroethylene; polydimethylaminoethyl methacrylate; polyethylacrylate; polyethylene; polyethylene terephthalate; polyglucuronic acid; polyglycerylmethacrylate; polyisobutene; polymethacrylamidopropyltrimonium chloride; polymethyl acrylate; polymethyl methacrylate; polyoxyisobutylene/methylene urea copolymer; polypropylene; Polyquaternium-1; Polyquaternium-10; Polyquaternium-11; Polyquaternium-12; Polyquaternium-13; Polyquaternium-14;

Polyquaternium-15; Polyquaternium-16; Polyquaternium-17; Polyquaternium-18; Polyquaternium-19; Polyquaternium-2; Polyquaternium-20; Polyquaternium-22; Polyquaternium-24; Polyquaternium-27; Polyquaternium-28; Polyquaternium-29; Polyquaternium-30; Polyquaternium-31; Polyquaternium-32; Polyquaternium-33; Polyquaternium-34; Polyquaternium-35; Polyquaternium-36; Polyquaternium-37; Polyquaternium-39; Polyquaternium-4; Polyquaternium-42; Polyquaternium-5; Polyquaternium-6; Polyquaternium-7; Polyquaternium-8; Polyquaternium-9; Polysilicone-6; polystyrene; polyurethane; polyvinyl acetate; polyvinyl alcohol; polyvinyl butyral; polyvinyl imidazolinium acetate; polyvinyl laurate; polyvinyl methyl ether; potassium acetate; potassium carrageenan; potassium hyaluronate; PPG-26/TDI copolymer; PPG-51/SMDI copolymer; procollagen; propylene glycol diundecanoate; PVM/MA copolymer; PVP; PVP/decene copolymer; PVP/dimethylaminoethylmethacrylate copolymer; PVP/eicosene copolymer; PVP/hexadecene copolymer; PVP/VA/itaconic acid copolymer; PVP/VA/vinyl propionate copolymer; PVP/va copolymer; rosin acrylate; rosin hydrolyzed collagen; rubber latex; shellac; shellac cera; sodium acrylate/vinyl alcohol copolymer; sodium carrageenan; sodium dvb/acrylates copolymer; sodium polyacrylate starch; sodium polymethacrylate; sodium polystyrene sulfonate; sodium PVM/MA/decadiene crosspolymer; sodium styrene/acrylamide copolymer; sodium styrene/acrylates copolymer; sodium tauride acrylates/acrylic acid/acrylonitrogens copolymer; soluble collagen; starch/acrylates/acrylamide copolymer; starch diethylaminoethyl ether; steareth-10 allyl ether/acrylates copolymer; stearylvinyl ether/MA copolymer; styrax benzoin; styrax benzoin; styrene/acrylates/acrylonitrile copolymer; styrene/acrylates/ ammonium methacrylate copolymer; styrene/allyl benzoate copolymer; styrene/MA copolymer; styrene/pvp copolymer; sucrose acetate isobutyrate; sucrose benzoate; sucrose benzoate/sucrose acetate isobutyrate/butyl benzyl phthalate/methyl methacrylate copolymer; sucrose benzoate/sucrose acetate isobutyrate/butyl benzyl phthalate; copolymer; sucrose benzoate/sucrose acetate isobutyrate copolymer; TEA-acrylates/acrylonitrogens copolymer; tosylamide/epoxy resin; tosylamide/formaldehyde resin; triacetin; tributyl citrate; tributylcresylbutane; tricetyl phosphate; tricontanyl PVP; trimethylpentanediol/isophthalic acid/trimellitic anhydride copolymer; tromethamine acrylates/acrylonitrogens copolymer; VA/butyl maleate/isobornyl acrylate copolymer; VA/crotonates/methacryloxybenzophenone-1 copolymer; VA/crotonates/vinyl neodecanoate copolymer; VA/crotonates/vinyl propionate copolymer; VA/crotonates copolymer; VA/dbm copolymer; VA/isobutyl maleate/vinyl neodecanoate copolymer; VA/vinyl butyl benzoate/crotonates copolymer; vinyl acetate; vinyl caprolactam/pvp/dimethylaminoethyl methacrylate copolymer.

The agent can also be an anti-nerve gas agent. An anti-nerve gas agent is an agent which counteracts the effects of a nerve gas agent. Examples of anti-nerve gas agents include: organophosphate hydrolases such as phosphotriesterase; pyridostigmine, physostigmine, eptastigmine, pralidoxime-2-chloride (2-PAM); potassium 2,3-butadion monoximate; potassium permanganate; sodium phenolate or sodium cresolate; chlorinated lime and magnesium oxide; chloramines; bentonite; and a mixture of atropine and PAM.

The agent can also be a vitamin including vitamin A,vitamin B, vitamin C, vitamin D, vitamin E, and their provitamin counterparts.

As mentioned above, the agent may be a pharmaceutical agent.

Examples of categories of pharmaceutical agents include: analgesic; amino acid; antagonist; anti-acne agent; anti-allergic; anti-asthmatic; antibacterial; anticholinergic; antifungal; antiglaucoma agent; antihistamine;

anti-infective; anti-infective, topical; anti-inflammatory; antikeratinizing agent; antimicrobial; antimycotic; antineoplastic, antineutropenic; antiproliferative; antipruritic; antiseborrheic; carbonic anhydrase inhibitor; cholinergic; cholinergic agonist; diagnostic aids; ectoparasiticide; fluorescent agent; glucocorticoid; hair growth stimulant; histamine H2 receptor antagonists; immunizing agent; immunomodulator; immunoregulator; immunostimulant; immunosuppressant; keratolytic; mucosal protective agent; radio; wound healing agent.

Analgesic: Acetaminophen; Alfentanil Hydrochloride; Aminobenzoate Potassium; Aminobenzoate Sodium; Anidoxime; Anileridine; Anileridine Hydrochloride; Anilopam Hydrochloride; Anirolac; Antipyrine; Aspirin; Benoxaprofen; Benzydamine Hydrochloride; Bicifadine Hydrochloride; Brifentanil Hydrochloride; Bromadoline Maleate; Bromfenac Sodium; Buprenorphine Hydrochloride; Butacetin; Butixirate; Butorphanol; Butorphanol Tartrate; Carbamazepine; Carbaspirin Calcium; Carbiphene Hydrochloride; Carfentanil Citrate; Ciprefadol Succinate; Ciramadol; Ciramadol Hydrochloride; Clonixeril; Clonixin; Codeine ; Codeine Phosphate; Codeine Sulfate; Conorphone Hydrochloride; Cyclazocine; Dexoxadrol Hydrochloride; Dexpemedolac; Dezocine; Diflunisal; Dihydrocodeine Bitartrate; Dimefadane; Dipyrone; Doxpicomine Hydrochloride; Drinidene; Enadoline Hydrochloride; Epirizole; Ergotamine Tartrate; Ethoxazene Hydrochloride; Etofenamate; Eugenol; Fenoprofen; Fenoprofen Calcium; Fentanyl Citrate; Floctafenine; Flufenisal; Flunixin; Flunixin Meglumine; Flupirtine Maleate; Fluproquazone; Fluradoline Hydrochloride; Flurbiprofen ; Hydromorphone Hydrochloride; Ibufenac; Indoprofen; Ketazocine; Ketorfanol; Ketorolac Tromethamine; Letimide Hydrochloride; Levomethadyl Acetate; Levomethadyl Acetate Hydrochloride; Levonantradol Hydrochloride; Levorphanol Tartrate; Lofemizole Hydrochloride; Lofentanil Oxalate; Lorcinadol; Lornoxicam; Magnesium Salicylate; Mefenamic Acid; Menabitan Hydrochloride; Meperidine Hydrochloride; Meptazinol Hydrochloride; Methadone Hydrochloride; Methadyl Acetate; Methopholine; Methotrimeprazine; Metkephamid Acetate; Mimbane Hydrochloride; Mirfentanil Hydrochloride; Molinazone; Morphine Sulfate; Moxazocine; Nabitan Hydrochloride; Nalbuphine Hydrochloride; Nalmexone Hydrochloride ; Namoxyrate; Nantradol Hydrochloride; Naproxen ; Naproxen Sodium ; Naproxol; Nefopam Hydrochloride; Nexeridine Hydrochloride; Noracymethadol Hydrochloride; Ocfentanil Hydrochloride; Octazamide; Olvanil; Oxetorone Fumarate; Oxycodone; Oxycodone Hydrochloride; Oxycodone Terephthalate; Oxymorphone Hydrochloride; Pemedolac; Pentamorphone; Pentazocine; Pentazocine Hydrochloride; Pentazocine Lactate; Phenazopyridine Hydrochloride; Phenyramidol Hydrochloride; Picenadol Hydrochloride; Pinadoline; Pirfenidone; Piroxicam Olamine; Pravadoline Maleate; Prodilidine Hydrochloride; Profadol Hydrochloride; Propiram Fumarate; Propoxyphene Hydrochloride; Propoxyphene Napsylate; Proxazole ; Proxazole Citrate ; Proxorphan Tartrate; Pyrroliphene Hydrochloride; Remifentanil Hydrochloride; Salcolex ; Salethamide Maleate; Salicylamide; Salicylate Meglumine; Salsalate ; Sodium Salicylate; Spiradoline Mesylate; Sufentanil; Sufentanil Citrate; Talmetacin ; Talniflumate ; Talosalate ; Tazadolene Succinate; Tebufelone ; Tetrydamine ; Tifurac Sodium; Tilidine Hydrochloride; Tiopinac; Tonazocine Mesylate; Tramadol Hydrochloride; Trefentanil Hydrochloride; Trolamine; Veradoline Hydrochloride; Verilopam Hydrochloride; Volazocine; Xorphanol Mesylate; Xylazine Hydrochloride; Zenazocine Mesylate; Zomepirac Sodium ; Zucapsaicin.

Antiacne: Adapalene; Erythromycin Salnacedin; Inocoterone Acetate.

Antiallergic: Amlexanox; Astemizole; Azelastine Hydrochloride; Eclazolast; Minocromil; Nedocromil; Nedocromil Calcium; Nedocromil Sodium; Nivimedone Sodium; Pemirolast Potassium; Pentigetide;

Pirquinozol; Poisonoak Extract; Probicromil Calcium; Proxicromil; Repirinast; Tetrazolast Meglumine; Thiazinamium Chloride; Tiacrilast; Tiacrilast Sodium; Tiprinast Meglumine; Tixanox.

Antiasthmatic: Ablukast; Ablukast Sodium; Azelastine Hydrochloride; Bunaprolast; Cinalukast; Cromitrile Sodium; Cromolyn Sodium; Enofelast; Isamoxole; Ketotifen Fumarate; Levcromakalim; Lodoxamide Ethyl; Lodoxamide Tromethamine; Montelukast Sodium; Ontazolast; Oxarbazole; Oxatomide; Piriprost; Piriprost Potassium; Pirolate; Pobilukast Edamine; Quazolast; Repirinast; Ritolukast; Sulukast; Tetrazolast Meglumine; Tiaramide Hydrochloride; Tibenelast Sodium; Tomelukast; Tranilast; Verlukast; Verofylline; Zarirlukast.

Antibacterial: Acedapsone; Acetosulfone Sodium; Alamecin; Alexidine; Amdinocillin; Amdinocillin Pivoxil; Amicycline; Amifloxacin; Amifloxacin Mesylate; Amikacin; Amikacin Sulfate; Aminosalicylic acid; Aminosalicylate sodium; Amoxicillin; Amphomycin; Ampicillin; Ampicillin Sodium; Apalcillin Sodium; Apramycin; Aspartocin; Astromicin Sulfate; Avilamycin; Avoparcin; Azithromycin; Azlocillin; Azlocillin Sodium; Bacampicillin Hydrochloride; Bacitracin; Bacitracin Methylene Disalicylate; Bacitracin Zinc; Bambermycins; Benzoylpas Calcium; Berythromycin ; Betamicin Sulfate; Biapenem; Biniramycin; Biphenamine Hydrochloride ; Bispyrithione Magsulfex; Butikacin; Butirosin Sulfate; Capreomycin Sulfate; Carbadox; Carbenicillin Disodium; Carbenicillin Indanyl Sodium; Carbenicillin Phenyl Sodium; Carbenicillin Potassium; Carumonam Sodium; Cefaclor; Cefadroxil; Cefamandole; Cefamandole Nafate; Cefamandole Sodium; Cefaparole; Cefatrizine; Cefazaflur Sodium; Cefazolin; Cefazolin Sodium; Cefbuperazone; Cefdinir; Cefepime; Cefepime Hydrochloride; Cefetecol; Cefixime; Cefmenoxime Hydrochloride; Cefmetazole; Cefmetazole Sodium; Cefonicid Monosodium; Cefonicid Sodium; Cefoperazone Sodium; Ceforanide; Cefotaxime Sodium; Cefotetan; Cefotetan Disodium; Cefotiam Hydrochloride; Cefoxitin; Cefoxitin Sodium; Cefpimizole; Cefpimizole Sodium; Cefpiramide; Cefpiramide Sodium; Cefpirome Sulfate; Cefpodoxime Proxetil; Cefprozil; Cefroxadine; Cefsulodin Sodium; Ceftazidime; Ceftibuten; Ceftizoxime Sodium; Ceftriaxone Sodium; Cefuroxime; Cefuroxime Axetil; Cefuroxime Pivoxetil; Cefuroxime Sodium; Cephacetrile Sodium; Cephalexin; Cephalexin Hydrochloride; Cephaloglycin; Cephaloridine; Cephalothin Sodium; Cephapirin Sodium; Cephradine; Cetocycline Hydrochloride; Cetophenicol; Chloramphenicol; Chloramphenicol Palmitate; Chloramphenicol Pantothenate Complex ; Chloramphenicol Sodium Succinate; Chlorhexidine Phosphanilate; Chloroxylenol; Chlortetracycline Bisulfate; Chlortetracycline Hydrochloride; Cinoxacin; Ciprofloxacin; Ciprofloxacin Hydrochloride; Cirolemycin ; Clarithromycin; Clinafloxacin Hydrochloride; Clindamycin; Clindamycin Hydrochloride; Clindamycin Palmitate Hydrochloride; Clindamycin Phosphate; Clofazimine ; Cloxacillin Benzathine; Cloxacillin Sodium; Cloxyquin; Colistimethate Sodium; Colistin Sulfate; Coumermycin; Coumermycin Sodium; Cyclacillin; Cycloserine; Dalfopristin; Dapsone ; Daptomycin; Demeclocycline; Demeclocycline Hydrochloride; Demecycline; Denofungin ; Diaveridine; Dicloxacillin; Dicloxacillin Sodium; Dihydrostreptomycin Sulfate; Dipyrithione; Dirithromycin; Doxycycline; Doxycycline Calcium ; Doxycycline Fosfatex; Doxycycline Hyclate; Droxacin Sodium; Enoxacin; Epicillin; Epitetracycline Hydrochloride; Erythromycin; Erythromycin Acistrate; Erythromycin Estolate; Erythromycin Ethylsuccinate; Erythromycin Gluceptate; Erythromycin Lactobionate; Erythromycin Propionate; Erythromycin Stearate; Ethambutol Hydrochloride; Ethionamide; Fleroxacin; Floxacillin; Fludalanine; Flumequine; Fosfomycin; Fosfomycin Tromethamine; Fumoxicillin; Furazolium Chloride; Furazolium Tartrate; Fusidate Sodium; Fusidic Acid; Gentamicin Sulfate; Gloximonam; Gramicidin; Haloprogin; Hetacillin; Hetacillin Potassium; Hexedine;

Ibafloxacin; Imipenem; Isoconazole; Isepamicin; Isoniazid; Josamycin; Kanamycin Sulfate; Kitasamycin; Levofuraltadone; Levopropylcillin Potassium; Lexithromycin; Lincomycin; Lincomycin Hydrochloride; Lomefloxacin; Lomefloxacin Hydrochloride; Lomefloxacin Mesylate; Loracarbef; Mafenide; Meclocycline; Meclocycline Sulfosalicylate; Megalomicin Potassium Phosphate; Mequidox; Meropenem; Methacycline; Methacycline Hydrochloride; Methenamine; Methenamine Hippurate; Methenamine Mandelate; Methicillin Sodium; Metioprim; Metronidazole Hydrochloride; Metronidazole Phosphate; Mezlocillin; Mezlocillin Sodium; Minocycline; Minocycline Hydrochloride; Mirincamycin Hydrochloride ; Monensin ; Monensin Sodium ; Nafcillin Sodium; Nalidixate Sodium; Nalidixic Acid; Natamycin; Nebramycin; Neomycin Palmitate; Neomycin Sulfate; Neomycin Undecylenate ; Netilmicin Sulfate; Neutramycin; Nifuradene; Nifuraldezone; Nifuratel ; Nifuratrone; Nifurdazil; Nifurimide; Nifurpirinol; Nifurquinazol; Nifurthiazole; Nitrocycline; Nitrofurantoin; Nitromide; Norfloxacin; Novobiocin Sodium; Ofloxacin; Ormetoprim; Oxacillin Sodium; Oximonam; Oximonam Sodium; Oxolinic Acid; Oxytetracycline; Oxytetracycline Calcium; Oxytetracycline Hydrochloride; Paldimycin; Parachlorophenol; Paulomycin; Pefloxacin; Pefloxacin Mesylate; Penamecillin; Penicillin G Benzathine; Penicillin G Potassium; Penicillin G Procaine; Penicillin G Sodium; Penicillin V; Penicillin V Benzathine; Penicillin V Hydrabamine; Penicillin V Potassium; Pentizidone Sodium; Phenyl Aminosalicylate; Piperacillin Sodium; Pirbenicillin Sodium; Piridicillin Sodium; Pirlimycin Hydrochloride; Pivampicillin Hydrochloride; Pivampicillin Pamoate; Pivampicillin Probenate; Polymyxin B Sulfate; Porfiromycin ; Propikacin; Pyrazinamide; Pyrithione Zinc; Quindecamine Acetate; Quinupristin; Racephenicol; Ramoplanin; Ranimycin; Relomycin; Repromicin; Rifabutin; Rifametane; Rifamexil; Rifamide; Rifampin; Rifapentine; Rifaximin; Rolitetracycline; Rolitetracycline Nitrate; Rosaramicin; Rosaramicin Butyrate; Rosaramicin Propionate; Rosaramicin Sodium Phosphate; Rosaramicin Stearate; Rosoxacin; Roxarsone; Roxithromycin; Sancycline; Sanfetrinem Sodium; Sarmoxicillin; Sarpicillin; Scopafungin ; Sisomicin; Sisomicin Sulfate; Sparfloxacin; Spectinomycin Hydrochloride; Spiramycin; Stallimycin Hydrochloride; Steffimycin; Streptomycin Sulfate; Streptonicozid; Sulfabenz ; Sulfabenzamide; Sulfacetamide; Sulfacetamide Sodium; Sulfacytine; Sulfadiazine; Sulfadiazine Sodium; Sulfadoxine; Sulfalene; Sulfamerazine; Sulfameter; Sulfamethazine; Sulfamethizole; Sulfamethoxazole; Sulfamonomethoxine; Sulfamoxole; Sulfanilate Zinc; Sulfanitran ; Sulfasalazine; Sulfasomizole; Sulfathiazole; Sulfazamet; Sulfisoxazole; Sulfisoxazole Acetyl; Sulfisoxazole Diolamine; Sulfomyxin; Sulopenem; Sultamicillin; Suncillin Sodium; Talampicillin Hydrochloride; Teicoplanin; Temafloxacin Hydrochloride; Temocillin; Tetracycline; Tetracycline Hydrochloride ; Tetracycline Phosphate Complex; Tetroxoprim; Thiamphenicol; Thiphencillin Potassium; Ticarcillin Cresyl Sodium; Ticarcillin Disodium; Ticarcillin Monosodium; Ticlatone; Tiodonium Chloride; Tobramycin; Tobramycin Sulfate; Tosufloxacin; Trimethoprim; Trimethoprim Sulfate; Trisulfapyrimidines; Troleandomycin; Trospectomycin Sulfate; Tyrothricin; Vancomycin; Vancomycin Hydrochloride; Virginiamycin; Zorbamycin.

Anticholinergic: Alverinc Citrate; Anisotropine Methylbromide; Atropine; Atropine Oxide Hydrochloride; Atropine Sulfate; Belladonna; Benapryzine Hydrochloride; Benzetimide Hydrochloride; Benzilonium Bromide; Biperiden ; Biperiden Hydrochloride; Biperiden Lactate ; Clidinium Bromide; Cyclopentolate Hydrochloride; Dexetimide; Dicyclomine Hydrochloride; Dihexyverine Hydrochloride; Domazoline Fumarate; Elantrine; Elucaine; Ethybenztropine; Eucatropine Hydrochloride; Glycopyrrolate; Heteronium Bromide; Homatropine Hydrobromide; Homatropine Methylbromide; Hyoscyamine; Hyoscyamine Hydrobromide; Hyoscyamine

Sulfate; Isopropamide Iodide; Mepenzolate Bromide; Methylatropine Nitrate; Metoquizine; Oxybutynin Chloride; Parapenzolate Bromide; Pentapiperium Methylsulfate; Phencarbamide; Poldine Methylsulfate; Proglumide; Propantheline Bromide; Propenzolate Hydrochloride; Scopolamine Hydrobromide; Tematropium Methylsulfate; Tiquinamide Hydrochloride; Tofenacin Hydrochloride; Toquizine; Triampyzine Sulfate; Trihexyphenidyl Hydrochloride; Tropicamide.

Antifungal: Acrisorcin; Ambruticin; Amphotericin B; Azaconazole; Azaserine; Basifungin; Bifonazole; Biphenamine Hydrochloride ; Bispyrithione Magsulfex ; Butoconazole Nitrate; Calcium Undecylenate; Candicidin; Carbol-Fuchsin; Chlordantoin; Ciclopirox; Ciclopirox Olamine; Cilofungin; Cisconazole; Clotrimazole; Cuprimyxin; Denofungin ; Dipyrithione; Doconazole; Econazole; Econazole Nitrate; Enilconazole; Ethonam Nitrate; Fenticonazole Nitrate; Filipin; Fluconazole; Flucytosine; Fungimycin; Griseofulvin; Hamycin; Isoconazole ; Itraconazole; Kalafungin; Ketoconazole; Lomofungin; Lydimycin; Mepartricin ; Miconazole; Miconazole Nitrate; Monensin ; Monensin Sodium ; Naftifine Hydrochloride; Neomycin Undecylenate ; Nifuratel ; Nifurmerone; Nitralamine Hydrochloride; Nystatin; Octanoic Acid; Orconazole Nitrate; Oxiconazole Nitrate; Oxifungin Hydrochloride; Parconazole Hydrochloride; Partricin ; Potassium Iodide ; Proclonol ; Pyrithione Zinc ; Pyrrolnitrin; Rutamycin; Sanguinarium Chloride ; Saperconazole; Scopafungin ; Selenium Sulfide ; Sinefungin; Sulconazole Nitrate; Terbinafine; Terconazole; Thiram; Ticlatone ; Tioconazole; Tolciclate; Tolindate; Tolnaftate; Triacetin; Triafungin; Undecylenic Acid; Viridofulvin; Zinc Undecylenate; Zinoconazole Hydrochloride.

Antiglaucoma agent: Alprenoxime Hydrochloride ; Colforsin; Dapiprazole Hydrochloride ; Dipivefrin Hydrochloride ; Naboctate Hydrochloride ; Pilocarpine; Pirnabine.

Antihistaminic: Acrivastine; Antazoline Phosphate; Astemizole ; Azatadine Maleate; Barmastine; Bromodiphenhydramine Hydrochloride; Brompheniramine Maleate; Carbinoxamine Maleate; Cetirizine Hydrochloride; Chlorpheniramine Maleate; Chlorpheniramine Polistirex; Cinnarizine; Clemastine; Clemastine Fumarate; Closiramine Aceturate; Cycliramine Maleate; Cyclizine; Cyproheptadine Hydrochloride ; Dexbrompheniramine Maleate; Dexchlorpheniramine Maleate; Dimethindene Maleate; Diphenhydramine Citrate; Diphenhydramine Hydrochloride; Dorastine Hydrochloride; Doxylamine Succinate; Ebastine; Levocabastine Hydrochloride; Loratadine; Mianserin Hydrochloride ; Noberastine; Orphenadrine Citrate ; Pyrabrom; Pyrilamine Maleate; Pyroxamine Maleate; Rocastine Hydrochloride; Rotoxamine; Tazifylline Hydrochloride; Temelastine; Terfenadine; Tripelennamine Citrate; Tripelennamine Hydrochloride; Triprolidine Hydrochloride; Zolamine Hydrochloride .

Anti-infective: Difloxacin Hydrochloride ; Lauryl Isoquinolinium Bromide; Moxalactam Disodium; Ornidazole; Pentisomicin; Sarafloxacin Hydrochloride; Protease inhibitors of HIV and other retroviruses; Integrase Inhibitors of HIV and other retroviruses; Cefaclor (Ceclor); Acyclovir (Zovirax); Norfloxacin (Noroxin); Cefoxitin (Mefoxin); Cefuroxime axetil (Ceftin); Ciprofloxacin (Cipro).

Anti-infective, topical: Alcohol; Aminacrine Hydrochloride; Benzethonium Chloride : Bithionolate Sodium; Bromchlorenone; Carbamide Peroxide; Cetalkonium Chloride; Cetylpyridinium Chloride : Chlorhexidine Hydrochloride; Clioquinol ; Domiphen Bromide; Fenticlor; Fludazonium Chloride; Fuchsin, Basic; Furazolidone ; Gentian Violet; Halquinols; Hexachlorophene: Hydrogen Peroxide; Ichthammol; Imidecyl Iodine; Iodine; Isopropyl Alcohol; Mafenide Acetate; Meralein Sodium; Mercufenol Chloride; Mercury, Ammoniated;

Methylbenzethonium Chloride; Nitrofurazone; Nitromersol; Octenidine Hydrochloride; Oxychlorosene; Oxychlorosene Sodium; Parachlorophenol, Camphorated; Potassium Permanganate; Povidone-Iodine; Sepazonium Chloride; Silver Nitrate; Sulfadiazine, Silver; Symclosene; Thimerfonate Sodium; Thimerosal : Troclosene Potassium.

Anti-inflammatory: Alclofenac; Alclometasone Dipropionate; Algestone Acetonide; Alpha Amylase; Amcinafal; Amcinafide; Amfenac Sodium; Amiprilose Hydrochloride; Anakinra; Anirolac ; Anitrazafen; Apazone; Balsalazide Disodium; Bendazac; Benoxaprofen ; Benzydamine Hydrochloride; Bromelains; Broperamole; Budesonide; Carprofen; Ciclopropfen; Cintazone; Cliprofen; Clobetasol Propionate; Clobetasone Butyrate; Clopirac; Cloticasone Propionate; Cormethasone Acetate; Cortodoxone; Deflazacort; Desonide; Desoximetasone; Dexamethasone Dipropionate; Diclofenac Potassium; Diclofenac Sodium; Diflorasone Diacetate; Diflumidone Sodium; Diflunisal ; Difluprednate; Diftalone; Dimethyl Sulfoxide; Drocinonide; Endrysone; Enlimomab ; Enolicam Sodium ; Epirizole ; Etodolac; Etofenamate ; Felbinac; Fenamole; Fenbufen; Fenclofenac; Fenclorac; Fendosal; Fenpipalone; Fentiazac; Flazalone; Fluazacort; Flufenamic Acid; Flumizole; Flunisolide Acetate; Flunixin ; Flunixin Meglumine ; Fluocortin Butyl; Fluorometholone Acetate; Fluquazone; Flurbiprofen ; Fluretofen; Fluticasone Propionate; Furaprofen; Furobufen; Halcinonide; Halobetasol Propionate; Halopredone Acetate; Ibufenac ; Ibuprofen; Ibuprofen Aluminum; Ibuprofen Piconol; Ilonidap; Indomethacin; Indomethacin Sodium; Indoprofen ; Indoxole; Intrazole; Isoflupredone Acetate; Isoxepac; Isoxicam; Ketoprofen; Lofemizole Hydrochloride ; Lornoxicam ; Loteprednol Etabonate; Meclofenamate Sodium; Meclofenamic Acid; Meclorisone Dibutyrate; Mefenamic Acid ; Mesalamine; Meseclazone; Methylprednisolone Suleptanate; Morniflumate; Nabumetone; Naproxen ; Naproxen Sodium ; Naproxol ; Nimazone; Olsalazine Sodium; Orgotein ; Orpanoxin; Oxaprozin; Oxyphenbutazone; Paranyline Hydrochloride; Pentosan Polysulfate Sodium; Phenbutazone Sodium Glycerate; Pirfenidone ; Piroxicam; Piroxicam Cinnamate; Piroxicam Olamine; Pirprofen; Prednazate; Prifelone; Prodolic Acid; Proquazone; Proxazole; Proxazole Citrate ; Rimexolone; Romazarit ; Salcolex ; Salnacedin; Salsalate ; Sanguinarium Chloride ; Seclazone ; Sermetacin; Sudoxicam; Sulindac; Suprofen; Talmetacin; Talniflumate ; Talosalate ; Tebufelone ; Tenidap; Tenidap Sodium; Tenoxicam; Tesicam; Tesimide; Tetrydamine ; Tiopinac; Tixocortol Pivalate; Tolmetin; Tolmetin Sodium; Triclonide; Triflumidate; Zidometacin; Zomepirac Sodium .

Antikeratinizing agent: Doretinel; Linarotene; Pelretin.

Antimicrobial:Aztreonam; Chlorhexidine Gluconate; Imidurea; Lycetamine; Nibroxane; Pirazmonam Sodium; Propionic Acid ; Pyrithione Sodium; Sanguinarium Chloride ; Tigemonam Dicholine.

Antimycotic: Amorolfine.

Antineoplastic: Acivicin; Aclarubicin; Acodazole Hydrochloride; Acronine; Adozelesin; Aldesleukin; Altretamine; Ambomycin; Ametantrone Acetate; Aminoglutethimide ; Amsacrine; Anastrozole; Anthramycin; Asparaginase; Asperlin ; Azacitidine; Azetepa; Azotomycin; Batimastat; Benzodepa; Bicalutamide; Bisantrene Hydrochloride; Bisnafide Dimesylate; Bizelesin; Bleomycin Sulfate; Brequinar Sodium; Bropirimine ; Busulfan; Cactinomycin; Calusterone; Caracemide; Carbetimer; Carboplatin; Carmustine; Carubicin Hydrochloride; Carzelesin; Cedefingol; Chlorambucil; Cirolemycin ; Cisplatin; Cladribine; Crisnatol Mesylate; Cyclophosphamide ; Cytarabine ; Dacarbazine; Dactinomycin; Daunorubicin Hydrochloride; Decitabine; Dexormaplatin; Dezaguanine; Dezaguanine Mesylate; Diaziquone; Docetaxel; Doxorubicin; Doxorubicin

Hydrochloride; Droloxifene; Droloxifene Citrate; Dromostanolone Propionate; Duazomycin; Edatrexate; Eflornithine Hydrochloride ; Elsamitrucin; Enloplatin; Enpromate; Epipropidine; Epirubicin Hydrochloride; Erbulozole; Esorubicin Hydrochloride; Estramustine; Estramustine Phosphate Sodium; Etanidazole; Ethiodized Oil I 131; Etoposide; Etoposide Phosphate; Etoprine; Fadrozole Hydrochloride; Fazarabine; Fenretinide; Floxuridine ; Fludarabine Phosphate; Fluorouracil; Flurocitabine; Fosquidone; Fostriecin Sodium; Gemcitabine; Gemcitabine Hydrochloride; Gold Au 198 ; Hydroxyurea; Idarubicin Hydrochloride; Ifosfamide; Ilmofosine; Interferon Alfa-2a ; Interferon Alfa-2b ; Interferon Alfa-n1; Interferon Alfa-n3; Interferon Beta-I a; Interferon Gamma-I b; Iproplatin; Irinotecan Hydrochloride ; Lanreotide Acetate; Letrozole; Leuprolide Acetate ; Liarozole Hydrochloride; Lometrexol Sodium; Lomustine; Losoxantrone Hydrochloride; Masoprocol; Maytansine; Mechlorethamine Hydrochloride; Megestrol Acetate; Melengestrol Acetate; Melphalan; Menogaril; Mercaptopurine; Methotrexate; Methotrexate Sodium; Metoprine; Meturedepa; Mitindomide; Mitocarcin; Mitocromin; Mitogillin; Mitomalcin; Mitomycin; Mitosper; Mitotane; Mitoxantrone Hydrochloride; Mycophenolic Acid; Nocodazole; Nogalamycin; Ormaplatin; Oxisuran; Paclitaxel; Pegaspargase; Peliomycin; Pentamustine; Peplomycin Sulfate; Perfosfamide; Pipobroman; Piposulfan; Piroxantrone Hydrochloride; Plicamycin; Plomestane; Porfimer Sodium; Porfiromycin ; Prednimustine; Procarbazine Hydrochloride; Puromycin; Puromycin Hydrochloride; Pyrazofurin; Riboprine; Rogletimide; Safingol ; Safingol Hydrochloride; Semustine; Simtrazene; Sparfosate Sodium; Sparsomycin; Spirogermanium Hydrochloride; Spiromustine; Spiroplatin; Streptonigrin; Streptozocin; Strontium Chloride Sr 89; Sulofenur; Talisomycin; Taxane; Taxoid; Tecogalan Sodium; Tegafur; Teloxantrone Hydrochloride; Temoporfin; Teniposide; Teroxirone; Testolactone; Thiamiprine; Thioguanine; Thiotepa; Tiazofurin; Tirapazamine; Topotecan Hydrochloride; Toremifene Citrate; Trestolone Acetate; Triciribine Phosphate; Trimetrexate; Trimetrexate Glucuronate; Triptorelin; Tubulozole Hydrochloride; Uracil Mustard; Uredepa; Vapreotide; Verteporfin; Vinblastine Sulfate; Vincristine Sulfate; Vindesine; Vindesine Sulfate; Vinepidine Sulfate; Vinglycinate Sulfate; Vinleurosine Sulfate; Vinorelbine Tartrate; Vinrosidine Sulfate; Vinzolidine Sulfate; Vorozole; Zeniplatin; Zinostatin; Zorubicin Hydrochloride.

Other anti-neoplastic compounds include: 20-epi-1,25 dihydroxyvitamin D3; 5-ethynyluracil; abiraterone; aclarubicin; acylfulvene; adecypenol; adozelesin; aldesleukin; ALL-TK antagonists; altretamine; ambamustine; amidox; amifostine; aminolevulinic acid; amrubicin; amsacrine; anagrelide; anastrozole; andrographolide; angiogenesis inhibitors; antagonist D; antagonist G; antarelix; anti-dorsalizing morphogenetic protein-1; antiandrogen, prostatic carcinoma; antiestrogen; antineoplaston; antisense oligonucleotides; aphidicolin glycinate; apoptosis gene modulators; apoptosis regulators; apurinic acid; ara-CDP-DL-PTBA; arginine deaminase; asulacrine; atamestane; atrimustine; axinastatin 1; axinastatin 2; axinastatin 3; azasetron; azatoxin; azatyrosine; baccatin III derivatives; balanol; batimastat; BCR/ABL antagonists; benzochlorins; benzoylstaurosporine; beta lactam derivatives; beta-alethine; betaclamycin B; betulinic acid; bFGF inhibitor; bicalutamide; bisantrene; bisaziridinylspermine; bisnafide; bistratene A; bizelesin; breflate; bropirimine; budotitane; buthionine sulfoximine; calcipotriol; calphostin C; camptothecin derivatives; canarypox IL-2; capecitabine; carboxamide-amino-triazole; carboxyamidotriazole; CaRest M3; CARN 700; cartilage derived inhibitor; carzelesin; casein kinase inhibitors (ICOS); castanospermine; cecropin B; cetrorelix; chlorins; chloroquinoxaline sulfonamide; cicaprost; cis-porphyrin; cladribine; clomifene analogues; clotrimazole; collismycin A; collismycin B; combretastatin A4; combretastatin analogue; conagenin; crambescidin 816;

crisnatol; cryptophycin 8; cryptophycin A derivatives; curacin A; cyclopentanthraquinones; cycloplatam; cypemycin; cytarabine ocfosfate; cytolytic factor; cytostatin; dacliximab; decitabine; dehydrodidemnin B; deslorelin; dexifosfamide; dexrazoxane; dexverapamil; diaziquone; didemnin B; didox; diethylnorspermine; dihydro-5-azacytidine; dihydrotaxol, 9-; dioxamycin; diphenyl spiromustine; docosanol; dolasetron; doxifluridine; droloxifene; dronabinol; duocarmycin SA; ebselen; ecomustine; edelfosine; edrecolomab; eflornithine; elemene; emitefur; epirubicin; epristeride; estramustine analogue; estrogen agonists; estrogen antagonists; etanidazole; etoposide phosphate; exemestane; fadrozole; fazarabine; fenretinide; filgrastim; finasteride; flavopiridol; flezelastine; fluasterone; fludarabine; fluorodaunorunicin hydrochloride; forfenimex; formestane; fostriecin; fotemustine; gadolinium texaphyrin; gallium nitrate; galocitabine; ganirelix; gelatinase inhibitors; gemcitabine; glutathione inhibitors; hepsulfam; heregulin; hexamethylene bisacetamide; hypericin; ibandronic acid; idarubicin; idoxifene; idramantone; ilmofosine; ilomastat; imidazoacridones; imiquimod; immunostimulant peptides; insulin-like growth factor-1 receptor inhibitor; interferon agonists; interferons; interleukins; iobenguane; iododoxorubicin; ipomeanol, 4-; irinotecan; iroplact; irsogladine; isobengazole; isohomohalicondrin B; itasetron; jasplakinolide; kahalalide F; lamellarin-N triacetate; lanreotide; leinamycin; lenograstim; lentinan sulfate; leptolstatin; letrozole; leukemia inhibiting factor; leukocyte alpha interferon; leuprolide + estrogen + progesterone; leuprorelin; levamisole; liarozole; linear polyamine analogue; lipophilic disaccharide peptide; lipophilic platinum compounds; lissoclinamide 7; lobaplatin; lombricine; lometrexol; lonidamine; losoxantrone; lovastatin; loxoribine; lurtotecan; lutetium texaphyrin; lysofylline; lytic peptides; maitansine; mannostatin A; marimastat; masoprocol; maspin; matrilysin inhibitors; matrix metalloproteinase inhibitors; menogaril; merbarone; meterelin; methioninase; metoclopramide; MIF inhibitor; mifepristone; miltefosine; mirimostim; mismatched double stranded RNA; mitoguazone; mitolactol; mitomycin analogues; mitonafide; mitotoxin fibroblast growth factor-saporin; mitoxantrone; mofarotene; molgramostim; monoclonal antibody, human chorionic gonadotrophin; monophosphoryl lipid A + myobacterium cell wall sk; mopidamol; multiple drug resistance gene inhibitor; multiple tumor suppressor 1-based therapy; mustard anticancer agent; mycaperoxide B; mycobacterial cell wall extract; myriaporone; N-acetyldinaline; N-substituted benzamides; nafarelin; nagrestip; naloxone + pentazocine; napavin; naphterpin; nartograstim; nedaplatin; nemorubicin; neridronic acid; neutral endopeptidase; nilutamide; nisamycin; nitric oxide modulators; nitroxide antioxidant; nitrullyn; O6-benzylguanine; octreotide; okicenone; oligonucleotides; onapristone; ondansetron; ondansetron; oracin; oral cytokine inducer; ormaplatin; osaterone; oxaliplatin; oxaunomycin; paclitaxel analogues; paclitaxel derivatives; palauamine; palmitoylrhizoxin; pamidronic acid; panaxytriol; panomifene; parabactin; pazelliptine; pegaspargase; peldesine; pentosan polysulfate sodium; pentostatin; pentrozole; perflubron; perfosfamide; perillyl alcohol; phenazinomycin; phenylacetate; phosphatase inhibitors; picibanil; pilocarpine hydrochloride; pirarubicin; piritrexim; placetin A; placetin B; plasminogen activator inhibitor; platinum complex; platinum compounds; platinum-triamine complex; porfimer sodium; porfiromycin; propyl bis-acridone; prostaglandin J2; proteasome inhibitors; protein A-based immune modulator; protein kinase C inhibitor; protein kinase C inhibitors, microalgal; protein tyrosine phosphatase inhibitors; purine nucleoside phosphorylase inhibitors; purpurins; pyrazoloacridine; pyridoxylated hemoglobin polyoxyethylene conjugate; raf antagonists; raltitrexed; ramosetron; ras farnesyl protein transferase inhibitors; ras inhibitors; ras-GAP inhibitor; retelliptine demethylated; rhenium Re 186 etidronate; rhizoxin; ribozymes; RII retinamide; rogletimide; rohitukine;

romurtide; roquinimex; rubiginone B1; ruboxyl; safingol; saintopin; SarCNU; sarcophytol A; sargramostim; Sdi 1 mimetics; semustine; senescence derived inhibitor 1; sense oligonucleotides; signal transduction inhibitors; signal transduction modulators; single chain antigen binding protein; sizofiran; sobuzoxane; sodium borocaptate; sodium phenylacetate; solverol; somatomedin binding protein; sonermin; sparfosic acid; spicamycin D; spiromustine; splenopentin; spongistatin 1; squalamine; stem cell inhibitor; stem-cell division inhibitors; stipiamide; stromelysin inhibitors; sulfinosine; superactive vasoactive intestinal peptide antagonist; suradista; suramin; swainsonine; synthetic glycosaminoglycans; tallimustine; tamoxifen methiodide; tauromustine; tazarotene; tecogalan sodium; tegafur; tellurapyrylium; telomerase inhibitors; temoporfin; temozolomide; teniposide; tetrachlorodecaoxide; tetrazomine; thaliblastine; thalidomide; thiocoraline; thrombopoietin; thrombopoietin mimetic; thymalfasin; thymopoietin receptor agonist; thymotrinan; thyroid stimulating hormone; tin ethyl etiopurpurin; tirapazamine; titanocene dichloride; topotecan; topsentin; toremifene; totipotent stem cell factor; translation inhibitors; tretinoin; triacetyluridine; triciribine; trimetrexate; triptorelin; tropisetron; turosteride; tyrosine kinase inhibitors; tyrphostins; UBC inhibitors; ubenimex; urogenital sinus-derived growth inhibitory factor; urokinase receptor antagonists; vapreotide; variolin B; vector system, erythrocyte gene therapy; velaresol; veramine; verdins; verteporfin; vinorelbine; vinxaltine; vitaxin; vorozole; zanoterone; zeniplatin; zilascorb; zinostatin stimalamer.

Anti-cancer Supplementary Potentiating Agents: Tricyclic anti-depressant drugs (e.g., imipramine, desipramine, amitryptyline, clomipramine, trimipramine, doxepin, nortriptyline, protriptyline, amoxapine and maprotiline); non-tricyclic anti-depressant drugs (e.g., sertraline, trazodone and citalopram); Ca^{++} antagonists (e.g., verapamil, nifedipine, nitrendipine and caroverine); Calmodulin inhibitors (e.g., prenylamine, trifluoroperazine and clomipramine);

Amphotericin B; Triparanol analogues (e.g., tamoxifen); antiarrhythmic drugs (e.g., quinidine); antihypertensive drugs (e.g., reserpine); Thiol depleters (e.g., buthionine and sulfoximine) and Multiple Drug Resistance reducing agents such as Cremaphor EL. The compounds of the invention also can be administered with cytokines such as granulocyte colony stimulating factor.

Antineutropenic: Filgrastim; Lenograstim; Molgramostim; Regramostim; Sargramostim.

Antiproliferative agent: Piritrexim Isethionate.

Antiprotozoal: Amodiaquine; Azanidazole; Bamnidazole; Carnidazole; Chlortetracycline Bisulfate; Chlortetracycline Hydrochloride; Flubendazole; Flunidazole; Halofuginone Hydrobromide; Imidocarb Hydrochloride; Ipronidazole; Metronidazole; Misonidazole; Moxnidazole; Nitarsone; Partricin; Puromycin; Puromycin Hydrochloride; Ronidazole; Sulnidazole; Tinidazole.

Antipruritic: Cyproheptadine Hydrochloride ; Methdilazine; Methdilazine Hydrochloride; Trimeprazine Tartrate.

Antipsoriatic: Acitretin; Anthralin; Azaribine; Calcipotriene; Cycloheximide; Enazadrem Phosphate; Etretinate; Liarozole Fumarate; Lonapalene; Tepoxalin.

Carbonic anhydrase inhibitor: Acetazolamide; Acetazolamide Sodium; Dichlorphenamide; Dorzolamide Hydrochloride; Methazolamide; Sezolamide Hydrochloride.

Cholinergic: Aceclidine; Bethanechol Chloride; Carbachol; Demecarium Bromide; Dexpanthenol; Echothiophate Iodide; Isoflurophate; Methacholine Chloride; Neostigmine Bromide; Neostigmine Methylsulfate;

Physostigmine; Physostigmine Salicylate; Physostigmine Sulfate; Pilocarpine ; Pilocarpine Hydrochloride; Pilocarpine Nitrate; Pyridostigmine Bromide.

Diagnostic aid: Aminohippurate Sodium; Anazolene Sodium; Arclofenin; Arginine ; Bentiromide; Benzylpenicilloyl Polylysine; Butedronate Tetrasodium; Butilfenin; Coccidioidin; Corticorelin Ovine Triflutate ; Corticotropin, Repository ; Corticotropin Zinc Hydroxide; Diatrizoate Meglumine; Diatrizoate Sodium; Diatrizoic Acid; Diphtheria Toxin for Schick Test; Disofenin; Edrophonium Chloride; Ethiodized Oil; Etifenin; Exametazime; Ferristenc; Ferumoxides; Ferumoxsil; Fluorescein; Fluorescein Sodium; Gadobenate Dimeglumine; Gadoteridol; Gadodiamide; Gadopentetate Dimegiumine; Gadoversetamide; Histoplasmin; Impromidine Hydrochloride; Indigotindisulfonate Sodium; Indocyanine Green ; Iobenguane Sulfate I 123; Iobenzamic Acid; Iocarmate Meglumine; Iocarmic Acid; Iocetamic Acid; Iodamide; Iodamide Megiumine; Iodipamide Meglumine; Iodixanol; Iodoxamate Meglumine; Iodoxamic Acid; Ioglicic Acid; Ioglucol; Ioglucomide; Ioglycamic Acid; Iogulamide; Iohexol; Iomeprol; Iopamidol; Iopanoic Acid; Iopentol; Iophendylate; Iprofenin; Iopronic Acid; Ioprocemic Acid; Iopydol; Iopydone; Iosefamic Acid; Ioseric Acid; Iosulamide Meglumine; Iosumetic Acid; Iotasul; Iotetric Acid; Iothalamate Meglumine; Iothalamate Sodium; Iothalamic Acid; Iotrolan; Iotroxic Acid; Ioversol; Ioxaglate Meglumine; Ioxagiate Sodium; Ioxaglic Acid; Ioxilan; Ioxotrizoic Acid; Ipodate Calcium; Ipodate Sodium; Isosulfan Blue; Leukocyte Typing Serum; Lidofenin; Mebrofenin; Meglumine; Metrizamide; Metrizoate Sodium; Metyrapone; Metyrapone Tartrate; Mumps Skin Test Antigen; Pentetic Acid; Propyliodone; Quinaldine Blue; Schick Test Control; Sermorelin Acetate ; Sodium Iodide I 123; Sprodiamide; Stannous Pyrophosphate; Stannous Sulfur Colloid; Succimer; Teriparatide Acetate; Tetrofosmin; Tolbutamide Sodium; Tuberculin; Tyropanoate Sodium; Xylose.

Ectoparasiticide: Nifluridide; Permethrin.

Glucocorticoid: Amcinonide; Beclomethasone Dipropionate; Betamethasone; Betamethasone Acetate; Betamethasone Benzoate; Betamethasone Dipropionate; Betamethasone Sodium Phosphate; Betamethasone Valerate; Carbenoxolone Sodium; Clocortolone Acetate; Clocortolone Pivalate; Cloprednol; Corticotropin; Corticotropin, Repository; Corticotropin Zinc Hydroxide; Cortisone Acetate; Cortivazol; Descinolone Acetonide; Dexamethasone; Dexamethasone Sodium Phosphate; Diflucortolone; Diflucortolone Pivalate; Flucloronide; Flumethasone; Flumethasone Pivalate; Flunisolide; Fluocinolone Acetonide; Fluocinonide; Fluocortolone; Fluocortolone Caproate; Fluorometholone; Fluperolone Acetate; Fluprednisolone; Fluprednisolone Valerate; Flurandrenolide; Formocortal; Hydrocortisone; Hydrocortisone Acetate; Hydrocortisone Buteprate; Hydrocortisone Butyrate; Hydrocortisone Sodium Phosphate; Hydrocortisone Sodium Succinate; Hydrocortisone Valerate; Medrysone; Methylprednisolone; Methylprednisolone Acetate; Methylprednisolone Sodium Phosphate; Methylprednisolone Sodium Succinate; Nivazol; Paramethasone Acetate; Prednicarbate; Prednisolone; Prednisolone Acetate; Prednisolone Hemisuccinate; Prednisolone Sodium Phosphate; Prednisolone Sodium Succinate; Prednisolone Tebutate; Prednisone; Prednival; Ticabesone Propionate; Tralonide; Triamcinolone; Triamcinolone Acetonide; Triamcinolone Acetonide Sodium; Triamcinolone Diacetate; Triamcinolone Hexacetonide.

Hair growth stimulant: Minoxidil .

Histamine H2 receptor antagonists: Ranitidine (Zantac); Famotidine (Pepcid); Cimetidine (Tagamet); Nizatidine (Axid).

Immunizing agent: Antirabies Serum; Antivenin (Latrodectus mactans); Antivenin (Micrurus Fulvius); Antivenin (Crotalidae) Polyvalent; BCG Vaccine; Botulism Antitoxin; Cholera Vaccine; Diphtheria Antitoxin; Diphtheria Toxoid; Diphtheria Toxoid Adsorbed; Globulin, Immune; Hepatitis B Immune Globulin; Hepatitis B Virus Vaccine Inactivated; Influenza Virus Vaccine; Measles Virus Vaccine Live; Meningococcal Polysaccharide Vaccine Group A; Meningococcal Polysaccharide Vaccine Group C; Mumps Virus Vaccine Live; Pertussis Immune Globulin; Pertussis Vaccine; Pertussis Vaccine Adsorbed; Plague Vaccine; Poliovirus Vaccine Inactivated; Poliovirus Vaccine Live Oral; Rabies Immune Globulin; Rabies Vaccine; $Rh_O(D)$ Immune Globulin; Rubella Virus Vaccine Live; Smallpox Vaccine; Tetanus Antitoxin; Tetanus Immune Globulin; Tetanus Toxoid; Tetanus Toxoid Adsorbed; Typhoid Vaccine; Yellow Fever vaccine; Vaccinia Immune Globulin; Varicella-Zoster Immune Globulin.

Immunomodulator: Dimepranol Acedoben; Imiquimod; Interferon Beta-1b; Lisofylline; Mycophenolate Mofetil; Prczatide Copper Acetate.

Immunoregulator: Azarole; Fanetizole Mesylate; Frentizole; Oxamisole Hydrochloride; Ristianol Phosphate; Thymopentin; Tilomisole.

Immunostimulant: Loxoribine ; Teceleukin.

Immunosuppressant: Azathioprine; Azathioprine Sodium; Cyclosporine; Daltroban; Gusperimus Trihydrochloride; Sirolimus; Tacrolimus.

Mucolytic: Acetylcysteine; Carbocysteine; Domiodol.

Mucosal Protective agents: Misoprostol (Cytotec).

Radioactive agent: Fibrinogen I 125 ; Fludeoxyglucose F 18 ; Fluorodopa F 18 ; Insulin I 125; Insulin I 131; Iobenguane I 123; Iodipamide Sodium I 131 ; Iodoantipyrine I 131 ; Iodocholesterol I 131 ; Iodohippurate Sodium I 123 ; Iodohippurate Sodium I 125 ; Iodohippurate Sodium I 131 ; Iodopyracet I 125 ; Iodopyracet I 131 ; Iofetamine Hydrochloride I 123 ; Iomethin I 125 ; Iomethin I 131 ; Iothalamate Sodium I 125 ; Iothalamate Sodium I 131 ; Iotyrosine I 131; Liothyronine I 125; Liothyronine I 131; Merisoprol Acetate Hg 197; Merisoprol Acetate Hg 203; Merisoprol Hg 197 ; Selenomethionine Se 75 ; Technetium Tc 99m Antimony Trisulfide Colloid; Technetium Tc 99m Bicisate ; Technetium Tc 99m Disofenin ; Technetium Tc 99m Etidronate; Technetium Tc 99m Exametazime ; Technetium Tc 99m Furifosmin ; Technetium Tc 99m Gluceptate ; Technetium Tc 99m Lidofenin ; Technetium Tc 99m Mebrofenin ; Technetium Tc 99m Medronate ; Technetium Tc 99m Medronate Disodium; Technetium Tc 99m Mertiatide ; Technetium Tc 99m Oxidronate ; Technetium Tc 99m Pentetate; Technetium Tc 99m Pentetate Calcium Trisodium; Technetium Tc 99m Sestamibi ; Technetium Tc 99m Siboroxime ; Technetium Tc 99m Succimer ; Technetium Tc 99m Sulfur Colloid ; Technetium Tc 99m Teboroxime ; Technetium Tc 99m Tetrofosmin ; Technetium Tc 99m Tiatide; Thyroxine I 125; Thyroxine I 131; Tolpovidone I 131 ; Triolein I 125; Triolein I 131.

Wound healing agent: Ersofermin.

Examples

Example 1: Durable suntan preparation and kit.

A kit is provided for producing a durable sunscreen. The kit includes three reservoirs (a distilled H_2O solution, a lysine oxidase stock (may be lyophilized), and a conjugate of a

low molecular weight sunscreen agent and a linking agent. The three solutions are mixed, as is conventional with such dispensing cans, as they are being applied onto tissue such as skin. The mixture is uniformly spread on the skin and allowed to remain for a sufficient period of time to permit crosslinking. The excess solution is removed by washing.

Example 2: Durable topical antifungal preparation and kit.

A kit is provided for producing durable antifungal protection. The kit includes three reservoirs (a distilled H_2O solution, a lysine oxidase stock (may be lyophilized), and a conjugate of an antifungal agent and a linking agent. The three solutions are mixed, as is conventional with such dispensing cans, as they are being applied onto tissue such as skin. The mixture is spread and so on as described in Example 1.

Example 3: Long-term protective preparation for anticholinesterase nerve gas and kit.

A kit for providing long-term protection from anticholinesterase nerve gas is provided. The kit includes four reservoirs (a distilled H_2O solution, a lysine oxidase stock (may be lyophilized), polylysine coupled to avidin, and recombinant cholinesterase coupled to biotin (e.g., by reaction in the presence of N.N. succinimide). The polylysine coupled to avidin is applied to the surface of the skin in the presence of lysine oxidase. After the avidin is coupled to the skin via the polylysine, then the recombinant cholinesterase coupled to biotin is added to bind the biotin to the avidin, thereby coupling the cholinesterase to the skin.

Example 4: A mousse for thickening hair.

A dispensing package with three reservoirs (a distilled H_2O solution, a lysine oxidase stock and a hair bulking or thickening agent such as a mucopolysaccharide linked to polylysine) is provided. The three solutions are mixed, as is conventional with such dispensing cans, as they are being applied onto tissue such as hair. The mousse can be combed through the hair, left on the hair for a sufficient period of time to permit crosslinking, and then rinsed.

Those skilled in the art will recognize, or be able to ascertain using no more than routine experimentation, many equivalents to the specific embodiments of the invention described herein. Such equivalents are intended to be encompassed by the following claims.

All references disclosed herein are incorporated by reference in their entirety.

We claim:

Claims

1. A method for attaching an agent to a body tissue comprising:

applying to the body tissue an agent attached to a linker selected from the group consisting of compounds that are substrates of lysine oxidase and compounds that react with lysine oxidase products,

applying to the body tissue lysine oxidase in an amount effective to permit crosslinking the agent attached to the linker to the body tissue via the linker, and

allowing said crosslinking to occur.

2. The method of claim 1, wherein the lysine oxidase is applied to the body tissue first.

3. The method of claim 1, wherein the linker comprises a molecule selected from the group consisting of:

(a) at least one amine, aldehyde or lysine,

(b) at least two contiguous linked amines, aldehydes or lysines,

(c) at least three contiguous linked amines, aldehydes or lysines,

(d) at least four contiguous linked amines, aldehydes or lysines, and

(e) at least five contiguous linked amines, aldehydes or lysines.

4. The method of claim 1, wherein the linker is 4 or more contiguous amines, aldehydes or lysines attached directly to one another by peptide bonds.

5. The method of claim 1, wherein the linker comprises a polymer of amino acids and wherein at least 20% of the amino acids are lysines.

6. The method of claim 5, wherein at least 30% of the amino acids are lysines.

7. The method of claim 5, wherein at least 40% of the amino acids are lysines.

8. The method of claim 1, further comprising first attaching to the body tissue a complementary linker, and attaching the complementary linker and the agent to one another by crosslinking the linker and the complementary linker by the lysine oxidase.

9. The method of claim 8, wherein the complementary linker is attached to the body tissue by applying to the body tissue the complementary linker,

applying to the body tissue an amount of lysine oxidase effective for crosslinking the complementary linker to the body tissue, and

allowing said crosslinking to occur.

10. The method of claim 9, wherein a polymer rich in lysine is one of the linker or complementary linker.

11. The method of claim 9, wherein the polymer rich in lysine has 4 or more contiguous lysines directly attached to one another by peptide bonds.

12. The method of claims 1-5, or 8, wherein the agent is not itself a substrate of lysine oxidase.

13. The method of claims 1-5, or 8, wherein the agent does not itself react with lysine oxidase substrates.

14. The method of claims 1-5, or 8, wherein the body tissue is selected from the group consisting of the integument, skin, hair, nails, a wound bed, and internal body tissue.

15. The method of claims 1-5, or 8, wherein the body tissue is selected from the group consisting of skin, hair and nails, and wherein the agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

16. The method of claims 1-5, or 8, wherein the agent is an enzyme.

17. The method of claim 16, wherein the enzyme is selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

18. The method of claims 1-5, or 8, wherein the agent is a pharmaceutical agent.

19. The method of claims 1-5, or 8, wherein the agent is selected from the groups consisting of a ligand of a ligand-receptor complex and a receptor of a ligand-receptor complex.

20. The method of claim 18, wherein the pharmaceutical agent and the linker are attached by a hydrolyzable bond.

21. The method of claims 1-5, or 8, wherein the agent is a nonprotein.

22. The method of claim 18, wherein the pharmaceutical agent is not itself a substrate for lysine oxidase and is not able to itself react with lysine oxidase products.

23. The method of claim 1, wherein the agent attached to a linker does not comprise a microparticle.

24. A method for attaching an agent to a body tissue, comprising:

first attaching to the body-tissue a linker which is covalently bondable to the agent in the presence of lysine oxidase,

then applying to the body tissue having the linker attached thereto an agent that is a substrate of lysine oxidase and which is covalently bonded to the linker in the presence of lysine oxidase,

applying to the body tissue lysine oxidase in an amount effective to crosslink the agent to the linker, and

allowing said crosslinking to occur.

25. The method of claim 24, wherein the linker is a substrate of lysine oxidase and wherein the linker is attached to the body tissue by

applying to the body tissue the linker,

applying to the body tissue lysine oxidase in an amount effective to permit crosslinking of the linker to the body tissue, and

allowing said crosslinking to occur.

26. The method of claim 24, wherein a polymer rich in lysine is the linker.

27. The method of claim 26, wherein the agent comprises a polymer rich in lysine.

28. The method according to any one of claims 24-34, wherein the agent is selected from the group consisting of a visible label of a high affinity noncovalent coupling pair, a pharmaceutical agent, a receptor or a ligand of a receptor/ligand pair, a cosmetic, a sunscreen agent, a coloring agent, a bulking agent, a hair conditioning agent, a hair fixative, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin and an insect repellant.

29. The method according to any one of claims 24-34, wherein the body tissue is selected from the group consisting of the integument, skin, hair, nails, a wound bed, and an internal tissue.

30. The method of claim 24, wherein the agent does not comprise a microparticle.

31. The method of claim 24, wherein the linker does not comprise a microparticle.

32. The method of claim 24, wherein the agent is selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

33. A method for sealing tissue comprising applying a force to hold two tissues in contact with each other in the presence of an amount of lysine oxidase effective to crosslink the two tissues to one another.

34. The method of claim 33, wherein surfaces of the tissues to be glued to one another are treated with a substrate of lysine oxidase which substrate is crosslinked to the surfaces of the tissues to interconnect the surfaces to one another.

35. The method of claim 33, further comprising;

first treating the surfaces to be linked to one another with a primary linker, and

then crosslinking the primary linkers to one another using a secondary linker in the presence of lysine oxidase.

36. A method for attaching an agent to a body tissue, comprising:

selecting an agent that is a substrate for lysine oxidase,

applying the agent in an isolated form to the body tissue in the presence of a sufficient amount of lysine oxidase to crosslink the isolated agent to the body tissue, and

allowing the crosslinking to occur.

37. The method of claim 36, wherein the agent is a conjugate of a native agent and a linker not native to the agent.

38. The method of claim 36, wherein the agent is a native agent free of conjugation with groups not native to the agent.

39. The method of claim 36, wherein the agent is a nonprotein.

40. A method for determining whether an agent is able to react with lysine oxidase products comprising

applying lysine oxidase to a proteinaceous material in an amount sufficient and under conditions appropriate to crosslink the agent to the proteinaceous material if the agent is a substrate of lysine oxidase, wherein the proteinaceous material is selected from the group consisting of

a body tissue,

a body tissue isolate,

a polymer rich in lysine, and

a polymer rich in glutamine and lysine, and

applying the agent to the proteinaceous material, and

determining whether the agent covalently binds to the proteinaceous material, covalent binding being indicative that the agent is able to react with lysine oxidase products.

41. The method of claim 40, wherein the agent is an active agent, wherein the active agent is a covalent conjugate of a native agent and a linker not native to the active agent.

42. The method of claim 40, wherein the active agent is a native active agent free of conjugation with groups not native to the active agent.

43. The method of any one of claims 40-42, wherein the agent is an active agent.

44. The method of any one of claims 40-42, wherein the agent is a nonprotein active agent.

45. The method of claim 40, wherein the agent comprises a detectable label.

46. The method of claim 40, wherein the agent comprises a microparticle.

47. A method for determining whether an agent is a substrate of lysine oxidase comprising

applying to the agent in an isolated form lysine oxidase in an amount sufficient and under conditions appropriate to produce lysine oxidase products if the agent is a substrate of lysine oxidase,

applying a detectable label having aldehydes or amines to the agent, and

determining whether the detectable label covalently binds to the agent, covalent binding being indicative that the agent is a substrate of lysine oxidase.

48. A kit comprising:

a package housing,

a first container containing a composition of matter comprising an agent attached to a linker, wherein the agent is selected from the group consisting of a sunscreen agent, a

cosmetic, an enzyme, a coloring agent, a pharmaceutical agent, a member of a ligand/receptor pair, a tissue sealant, an insect repellant and a component of a high affinity noncovalent coupling pair, and

wherein the linker is a substrate for lysine oxidase, or is able to react with lysine oxidase products, and the linker is not native to the agent, and

a second container containing lysine oxidase.

49. The kit of claim 48, further comprising

a third container housed by said package, the third container containing a linker that is a substrate of lysine oxidase and that is covalently attached to the composition contained in the first container in the presence of lysine oxidase.

50. The kit of claim 48, further comprising calcium housed by said package, except that said calcium is not in said second container.

51. A method of treating a subject to attach microparticles to a skin surface of the subject comprising

contacting the skin surface with lysine oxidase in an amount effective to permit crosslinking of the microparticles to the skin surface

contacting the skin surface with microparticles having surface available reactive groups in an amount sufficient to attach the microparticles to the skin surface in the presence of lysine oxidase,

allowing the microparticles to remain in contact with the skin surface for a time sufficient to permit a layer of microparticles to covalently attach to the skin surface.

52. The method of claim 51, wherein the surface available reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines or lysines.

53. The method of claim 51, wherein the layer of microparticles is non-planar.

54. The method of claim 51, wherein the microparticles further comprise an agent, or an active agent, or a non-nucleic acid active agent, or a non-protein active agent.

55. The method of claim 54, wherein the active agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

56. The method of claim 54, wherein the active agent is not itself a substrate of lysine oxidase and is not itself able to react with lysine oxidase products.

57. The method of claim 51, wherein the microparticles further comprise a synthetic polymer, preferably the synthetic polymer is latex or polystyrene.

58. The method of claim 51, wherein the microparticles are porous.

59. The method of claim 51, wherein the microparticles have a size selected from the group consisting of greater than 5 μm, less than 5μm, less than 1 μm, 100 nm to 500 nm, less than 100 nm, 20 nm to 90 nm, 20 nm to 35 nm, less than 20 nm, 1 nm to 10 nm, and 5 nm to 10 nm.

60. The method of claim 51, wherein the microparticles are non-biodegradable, water insoluble or detergent insoluble.

61. The method of claim 51, wherein the reactive groups are part of a polymer, preferably the polymer is covalently attached to the microparticle.

62. The method of claim 61, wherein the polymer is comprised of at least 50% units having reactive groups, or the polymer is lysine-rich at a surface available terminus, or the polymer comprises a polymer selected from the group consisting of:

(a) at least two contiguous linked units having reactive groups,

(b) at least three contiguous linked units having reactive groups,

(c) at least four contiguous linked units having reactive groups,

(d) at least five contiguous linked units having reactive groups,

(e) at least ten contiguous linked units having reactive groups,

(f) at least fifteen contiguous linked units having reactive groups, and

(g) at least twenty contiguous linked units having reactive groups,

wherein the reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines and lysines.

63. The method of claim 51, wherein the agent is selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

64. A kit comprising

a microparticle comprising surface available reactive groups in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase, and

lysine oxidase.

65. The kit of claim 64, further comprising instructions for topically administering the microparticle to a skin surface.

66. The kit of claim , further comprising a complementary linker.

67. The kit of claim 64, wherein the surface available reactive groups selected from the groups consisting of amines, aldehydes, aliphatic amines and lysines.

68. The kit of claim 64, wherein the microparticle further comprises an agent, an active agent, a non-nucleic acid active agent, or a non-protein active agent.

69. The kit of claim 68, wherein the active agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent, a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

70. The kit of claim 68, wherein the active agent is not itself a substrate of lysine oxidase, and is not able to react with lysine oxidase products.

71. The kit of claim 64, wherein the agent is an enzyme that degrades nerve agents and is selected from the group consisting of OPAA anhydrolase and squid type OPA anhydrase.

72. The kit of claim 64, wherein the microparticle further comprises a synthetic polymer, preferably the synthetic polymer is latex or polystyrene.

73. The kit of claim 64, wherein the microparticle is porous.

74. The kit of claim 64, wherein the microparticle has a size selected from the group consisting of greater than 5 μm, less than 5 μm, less than 1 μm, 100 nm to 500 nm, less than 100 nm, 20 nm to 90 nm, 20 nm to 35 nm, less than 20 nm, 1 nm to 10nm and 5 nm to 10 nm.

75. The kit of claim 64, wherein the microparticle is non-biodegradable, water insoluble or detergent insoluble.

76. The kit of claim 64, wherein the surface available reactive groups are part of a polymer, and wherein the polymer is covalently attached to the microparticle.

77. The kit of claim 76, wherein the polymer is comprised of at least 50% units having reactive groups, or the polymer is lysine-rich at a surface available terminus, or the polymer comprises a polymer selected from the group consisting of:

(a) at least two contiguous linked units having reactive groups,
(b) at least three contiguous linked units having reactive groups,
(c) at least four contiguous linked units having reactive groups,
(d) at least five contiguous linked units having reactive groups.
(e) at least ten contiguous linked units having reactive groups,
(f) at least fifteen contiguous linked units having reactive groups, and
(g) at least twenty contiguous linked units having reactive groups,

wherein the reactive groups are selected from the group consisting of amines, aldehydes, aliphatic amines and lysines.

78. The kit of claim 64, wherein the microparticle is provided in a topically administered form selected from the group consisting of an ointment, an aerosol, a gel, and a lotion.

79. A kit comprising

a microparticle comprising surface available reactive groups in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase, and

instructions for topically administering the microparticle to a skin surface,

wherein the surface available reactive groups are selected from the group consisting of aldehydes and amines.

80. The kit of claim 79, further comprising a cleanser.

81. The kit of claim 79, further comprising a complementary linker.

82. A composition comprising

a microparticle comprising an agent and a polymer rich in amine or aldehyde reactive groups, wherein the amine or aldehyde reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of lysine oxidase.

83. The composition of claim 82, wherein the microparticle is non-biodegradable, preferably water insoluble or detergent insoluble.

84. The composition of claim 82, wherein the agent is an active agent, or a non-nucleic acid active agent, or a non-protein active agent.

85. The composition of claim 82, wherein the agent is selected from the group consisting of a cosmetic agent, a bulking agent, a hair conditioning agent, a hair fixative, a sunscreen agent, a moisturizing agent, a depilatory agent, an anti-nerve gas agent, a film forming agent,

a vitamin, an insect repellant, a coloring agent, a pharmaceutical agent, a ligand-receptor complex and a receptor of a ligand-receptor complex.

86. The composition of claim 82, wherein the agent is not itself a substrate of lysine oxidase and is not able to react with lysine oxidase products.

87. The composition of claim 82, wherein the microparticle further comprises a synthetic polymer, preferably the synthetic polymer is latex or polystyrene.

88. The composition of claim 87, wherein the polymer rich in reactive groups is covalently linked to the synthetic polymer.

89. The composition of claim 82, wherein the microparticle is porous.

90. The composition of claim 82, wherein the microparticle has a size selected from the group consisting of greater than 5 μm, less than 5 μm, less than 1 μm, 100 nm to 500 nm, less than 100 nm, 20 nm to 90 nm, 20 nm to 35 nm, less than 20 nm, 1 nm to 10 nm, and 5 nm to 10 nm.

91. The composition of claim 82, wherein the lysine oxidase is exogenous lysine oxidase.

92. The composition of claim 82, wherein the reactive groups are surface available in an amount sufficient to attach the microparticle to a skin surface in the presence of exogenous lysine oxidase.

89. The composition of claim 82, wherein the polymer rich in units having reactive groups is covalently attached to the microparticle.

90. The composition of claim 82, wherein the polymer rich in units having reactive groups comprises a polymer of amino acids and wherein at least 50% of the amino acids are lysine, or the polymer rich in reactive groups is reactive group rich at a surface available terminus, or

the polymer rich in reactive groups comprises a polymer selected from the group consisting of:

(a) at least two contiguous linked lysines,

(b) at least three contiguous linked lysines,

(c) at least four contiguous linked lysines, and

(d) at least five contiguous linked lysines.

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(54) Title: LYSINE OXIDASE LINKAGE OF AGENTS TO TISSUE

(57) Abstract: Methods, products and kits are provided for attaching agents to body tissues using lysine oxidase.

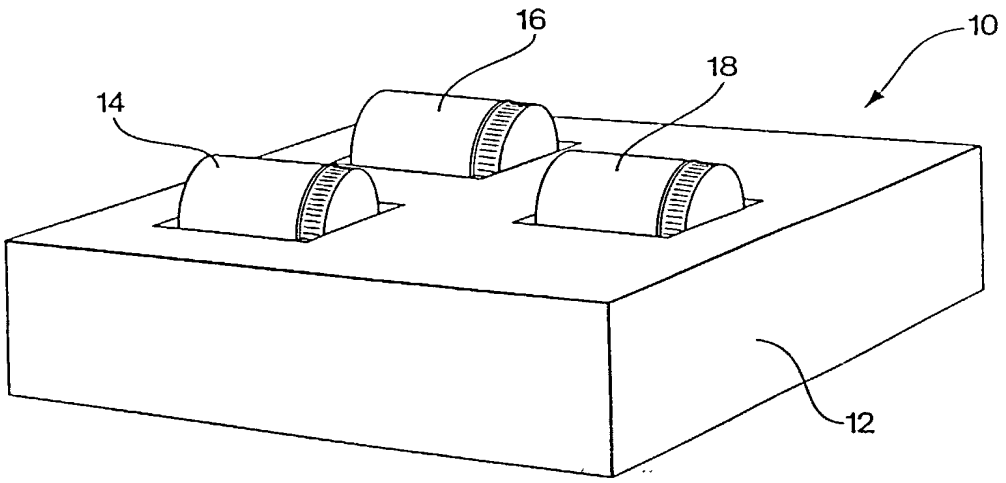

Fig. 1

Attorney Docket No. H0535/7014 (ERG/MAT)

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

LYSINE OXIDASE LINKAGE OF AGENTS TO TISSUE

the specification of which is attached hereto unless the following is checked:

[X] was filed on January 22, 2002, as U.S. Application No. 10/031,673, bearing attorney docket No. H0535/7014

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or section 365(a) of any PCT International application designating at least one country other than the United States listed below and have also identified below any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed:

Prior Foreign PCT International Application(s)and any priority claims under 35 U.S.C. §§119 and 365(a),(b):

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(Application Number)	(filing date)
(Application Number)	(filing date)

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1-00

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